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POST-REMEDIAL ACTION REPORT FOR WORK PACKAGE 420, CHEMICAL PLANT AREA FOUNDATIONS AND CONTAMINATED SOIL REMOVAL, REMEDIAL UNIT 8

WELDON SPRING SITE REMEDIAL ACTION PROJECT
WELDON SPRING, MISSOURI

FEBRUARY 1998 **REV. 0**

U.S. Department of Energy
Oak Ridge Operations Office
Weldon Spring Site Remedial Action Project

Prepared by MK-Ferguson Company and Jacobs Engineering Group

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APPROVALS

Department Manager	2/11/98 Date
Data Administration Coordinator	2/11/98 Date
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Weldon Spring Site Remedial Action Project

Post-Remedial Action Report for Work Package 420, Chemical Plant Area Foundations and Contaminated Soil Removal, Remedial Unit 8

EXECUTIVE SUMMARY

Revision 0

February 1998

Prepared by

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7295 Highway 94 South
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for the

U.S. DEPARTMENT OF ENERGY
Oak Ridge Operations Office
Under Contract DE-AC05-86OR21548

EXECUTIVE SUMMARY

The Chemical Plant Area Foundations and Contaminated Soil Removal Work Package-420 (WP-420) was initiated to remediate contaminated areas within the WP-420 construction limits to facilitate the construction of an on-site disposal facility. Much of the WP-420 area will be covered by the disposal facility footprint. Remediation activities included the excavation and removal of building foundations, underground utilities, and associated contaminated soils.

The objective of confirmation was to ensure that contaminated areas within WP-420 were remediated to meet the cleanup standards stated in the Record of Decision for the Remedial Action at the Chemical Plant Area of the Weldon Spring Site (ROD) (Ref. 3). Confirmation soil sampling methodology was developed to ensure the adequate remediation of contaminants of concern (COCs).

The remediation and confirmation sampling process included several activities. Components of the process included characterization data review, COC identification, confirmation plan development, contaminated materials and soil excavation, radiological walkover surveying, confirmation sampling, field oversight, sample analysis, analytical data evaluation, disposition package development, QA/QC review, summary of findings and conclusions, and post remedial action report preparation.

The WP-420 area consisted of five Remedial Units (RU6 through RU10) which were subdivided into confirmation units (CU). Each of the CUs was approximately 2,000 m2 (0.5 acres) in size, as determined by the Chemical Plant Area Cleanup Attainment Confirmation Plan (Ref. 5). This Post-Remedial Action Report is the third of five such reports, and summarizes the remediation of CUs 80 through 93, which are located within RU8.

COC lists were developed for each CU using historical background information and characterization soil sample results. COCs identified for RU8 included Radium 226 (Ra-226), Radium-228 (Ra-228), Thorium 230 (Th-230), Thorium 232 (Th-232), Uranium 238 (U-238), arsenic, chromium, lead, and polychlorinated biphenyls (PCBs).

Remedial activities for each CU included the excavation of contaminated soil, radiological walkover surveys, and confirmation soil sampling. Additional contaminated soil was excavated and confirmation samples were collected until preliminary results indicated that remediation activities were completed and COC concentrations were below the cleanup standards. The CU was then released for unrestricted use. Once final analytical results were received, the data were compared to preliminary results to verify that the established cleanup standards were achieved.

Portions of CUs located on the western and southern boundaries of RU8 (i.e., areas located west or south of the access road), were eliminated from WP-420 remedial activities. An Inter-Office Correspondence (IOC) detailing the decision was issued. These remaining areas located in CU80, CU81, CU82, CU83, CU84, and CU87 will be addressed under a future Work Package at a later date. In addition, both CU78 and CU79 were removed from the WP-420 Work Package and will be addressed under another Work Package at a later date.

A summary of final analytical results for WP-420 RU8 is presented below. The table was generated using the data set compiled from all samples representing soils left in place.

Summary of Analytical Results for RU8 in WP-420

Contaminant	NUMBER OF SAMPLES	ALARA Goal/ Cleanup Criteria	Range of Concentration	Average Concentration	Number Greater than ALARA
Arsenic (mg/kg)	15	45/75	4.7-34.1	10.07	0
Chromium (mg/kg)	15	90/100	12.4-22.3	16.52	0
Lead (mg/kg)	15	240/450	10.1-27.3	16.07	0
PCB (mg/kg)	20	0.65/8	0-5.8	0.58	5
Ra-226 (pCi/g)	22	5.0/6.2	1.28-1.67	1.48	0
Ra-228 (pCi/g)	22	5.0/6.2	0.63-1.75	1.24	0
Combined Radium	22	5.0/6.2	2.02-3.42	2.73	0
Th-230 (pCi/g)	32	5.0/6.2	0.89-5.65	1.46	1
Th-232 (pCi/g)	21	5.0/6.2	0.63-1.66	1.22	0
U-238 (pCi/g)	254	30/120	0.73-25.5	4.67	0

As indicated on the table, the RU8 average concentration for each COC is below the ALARA goal. For each of the 14 CUs located within RU8, COC averages were also calculated and the conclusions are as follows. Although some individual sample concentrations are above the ALARA goals, the average COC concentrations for each of the 14 CUs except PCBs, are below ALARA. The average PCB concentration was above the ALARA goal at one CU, CU86. Based on the ALARA committee decision, the CU was unconditionally released. The average PCB concentration for all 14 CUs are below the cleanup criteria. In addition, of the total number of PCB samples collected, in RU8 more than 50% were below the ALARA goal.

Remedial activities were completed for RU8. Based on the analytical results presented above, all 14 CUs were released in accordance with the cleanup standards stated in the Chemical Plant Area Cleanup Attainment Confirmation Plan (Ref. 5).

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Weldon Spring Site Remedial Action Project

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Revision 0

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ABSTRACT

The Weldon Spring Site Remedial Action Project (WSSRAP) work package for removal of foundations and contaminated soil from the chemical plant area (WP-420) remediated contaminated areas to facilitate construction of an on-site disposal facility. Much of the WP-420 area will be covered by the disposal facility footprint. Remedial activities included excavating and removing building foundations and contaminated soil and performing radiological walkover surveys and sampling remaining soils. Averages for contaminants of concern in each of 14 confirmation units were calculated. Although some concentrations were above the as-low-as-reasonably-achievable (ALARA) goals, the average in each unit (except PCBs, which were above average in one unit) was below ALARA. All 14 confirmation units were released in accordance with the cleanup standards stated in the *Chemical Plant Area Cleanup Attainment Confirmation Plan.*

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1. INTRODUCTION

1.1 Purpose

This report details the field activities and analytical results for the chemical plant area building foundations and contaminated soils removal within Remedial Unit (RU) 8 of the Work Package-420 area (WP-420), at the Weldon Spring Site Remedial Action Project (WSSRAP). WP-420 includes the removal of building foundations, underground utilities, and the associated contaminated soils necessary prior to the construction of the on-site disposal facility. The footprint of the disposal facility will cover much of the WP-420 area.

Soil characterization results from the *Remedial Investigation for the Chemical Plant Area of the Weldon Spring Site* (Ref. 1), and the *Supplementary Soil Sampling Plan* (Ref. 2) determined that there were areas within the WP-420 area that contained contaminant concentrations that exceeded the cleanup standards established in the *Record of Decision for Remedial Action at the Chemical Plant Area of the Weldon Spring Site* (ROD) (Ref. 3). The chemical plant area building foundations and contaminated soils removal was initiated to remove contaminated soils in excess of cleanup standards prior to construction of the on-site disposal facility. Remediation was designed to attain ALARA goals.

1.2 Scope

This report describes the remedial activities and confirmation sampling conducted on radiological and chemically contaminated soils within RU8 of the WP-420 area. Soil confirmation sampling was conducted in accordance with the *Confirmation Sampling Plan Details for the Chemical Plant Area Foundations and Contaminated Soils Removal (WP-420)* (Ref. 4). This plan was developed to ensure that the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 5) objectives were accomplished, and additionally, to ensure established remediation requirements of the ROD (Ref. 3) were met.

1.3 Site Description and History

The WSSRAP is located in St. Charles County, Missouri, about 48 km (30 mi.) from St. Louis, on land formerly used by the U.S. Department of the Army (Army) as a trinitrotoluene (TNT) and dinitrotoluene (DNT) ordnance works (Figure 1-1). The 88-ha (217 acre) chemical plant area is located about 3.2 km (2 mi.) southwest of the junction of Missouri State Route 94 and U.S. Route 40/61. The site is accessible from Missouri Route 94 and is fenced and closed to the public.

The two communities closest to the site, Weldon Spring and Weldon Spring Heights, are located approximately 3.2 km (2 mi.) east of the site and have a combined population of

850 persons. Francis Howell High School is located about 1 km (0.6 mile) from the site on the eastern side.

In 1941, the Army acquired 7,000 ha (17,000 acres) of land in St. Charles County, Missouri. The Army constructed an ordnance facility and produced DNT and TNT explosives from 1941 until 1946. By 1949, all but 810 ha (2,000 acres) were transferred to the State of Missouri and the University of Missouri. Most of the remaining land became the chemical plant area of Weldon Spring and the adjacent U.S. Army Reserve and National Guard Training Area.

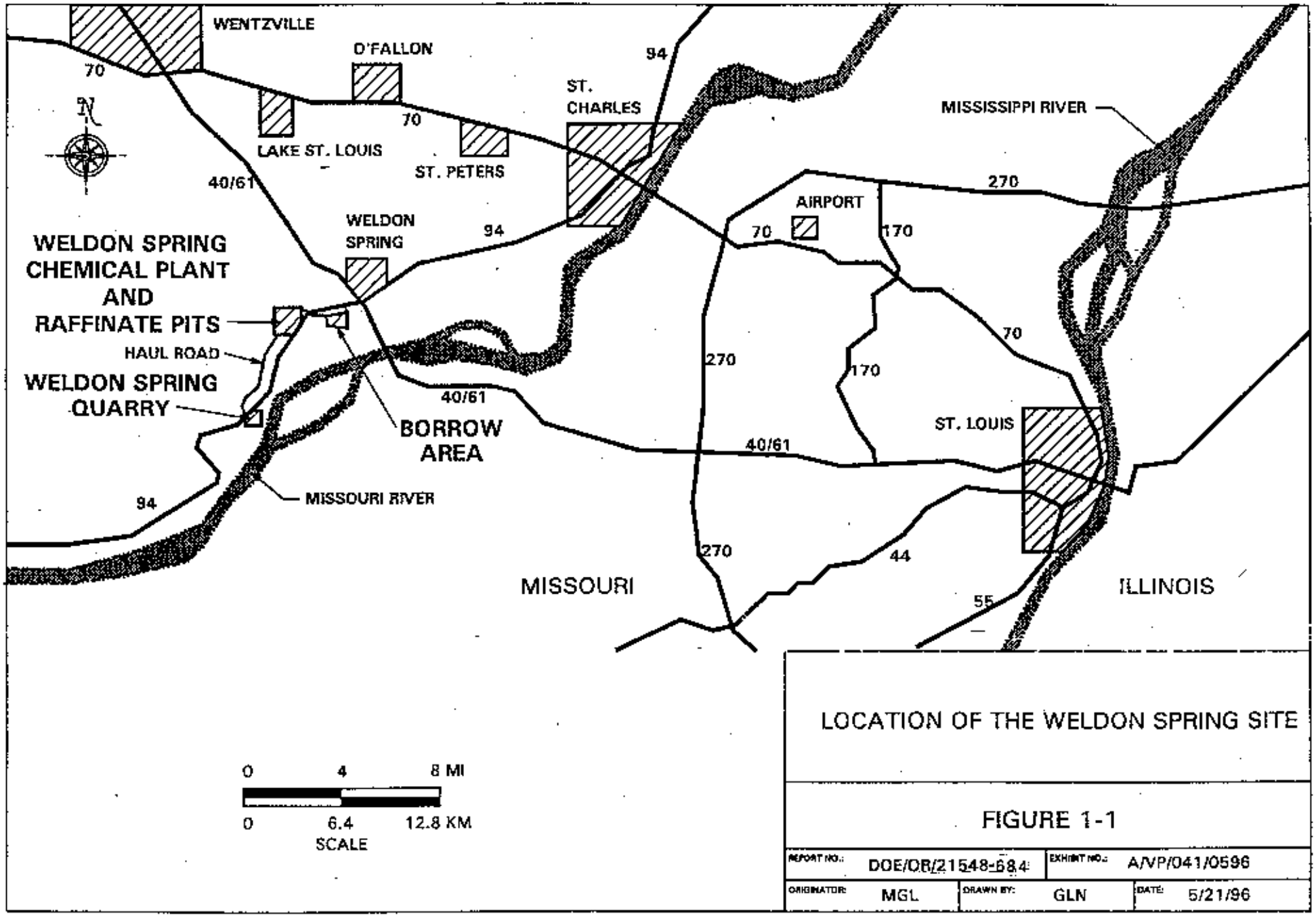
In May 1955, the U.S. Atomic Energy Commission (AEC) acquired 83 ha (205 acres) to construct a uranium feed materials plant. The AEC operated the uranium feed materials plant from 1957 to 1966 within the WSSRAP area. During its operation, uranium and thorium ore concentrates were processed, which led to the contaminated soils found within the WP-420 area. Radioactive and chemical wastes were disposed of at the site during this period. The radioactive contaminants associated with the site are primarily radionuclides of the natural uranium and Th-232 decay series. Chemical contaminants associated with the site are primarily heavy metals, polychlorinated biphenyls (PCBs) and polynuclear aromatic hydrocarbons (PAHs).

The Army reacquired the chemical plant property in 1967 and began decontamination and dismantlement operations in order to construct a herbicide facility. The project was canceled in 1969 before herbicide production was initiated. In 1985, the Army transferred responsibility over to the U.S. Department of Energy (DOE), successor to the AEC. The DOE initiated a series of interim response actions starting in 1986 to control and mitigate releases to the environment. The chemical plant area was included in the National Priorities List (NPL) in 1989. The Chemical Plant ROD (Ref. 3) was signed in 1993. Building dismantlement also began in 1992 and continued through 1994. Building foundations and contaminated soil were removed during 1996/1997, as part of Work Package 420.

The WP-420 area is located within the eastern portion of the site. There are five work zones within this work package and each zone has been assigned an RU. The WP-420 area consisted of five RUs: RU6, RU7, RU8, RU9, and RU10 (Work Zones 1-5, respectively). The five RUs are depicted in Figure 1-2.

1.4 Remediation and Confirmation Process

This report details the activities conducted to remediate RU8 (CU78 through CU93). Remediation consisted of removal of building foundations, underground utilities, and the associated contaminated soils. Following the remediation activities, confirmation samples were collected to ensure contaminated materials had been removed.



LOCATION OF THE WELDON SPRING SITE

FIGURE 1-1

REPORT NO.:	DOE/OR/21548-684	EXHIBIT NO.:	A/VP/041/0596		
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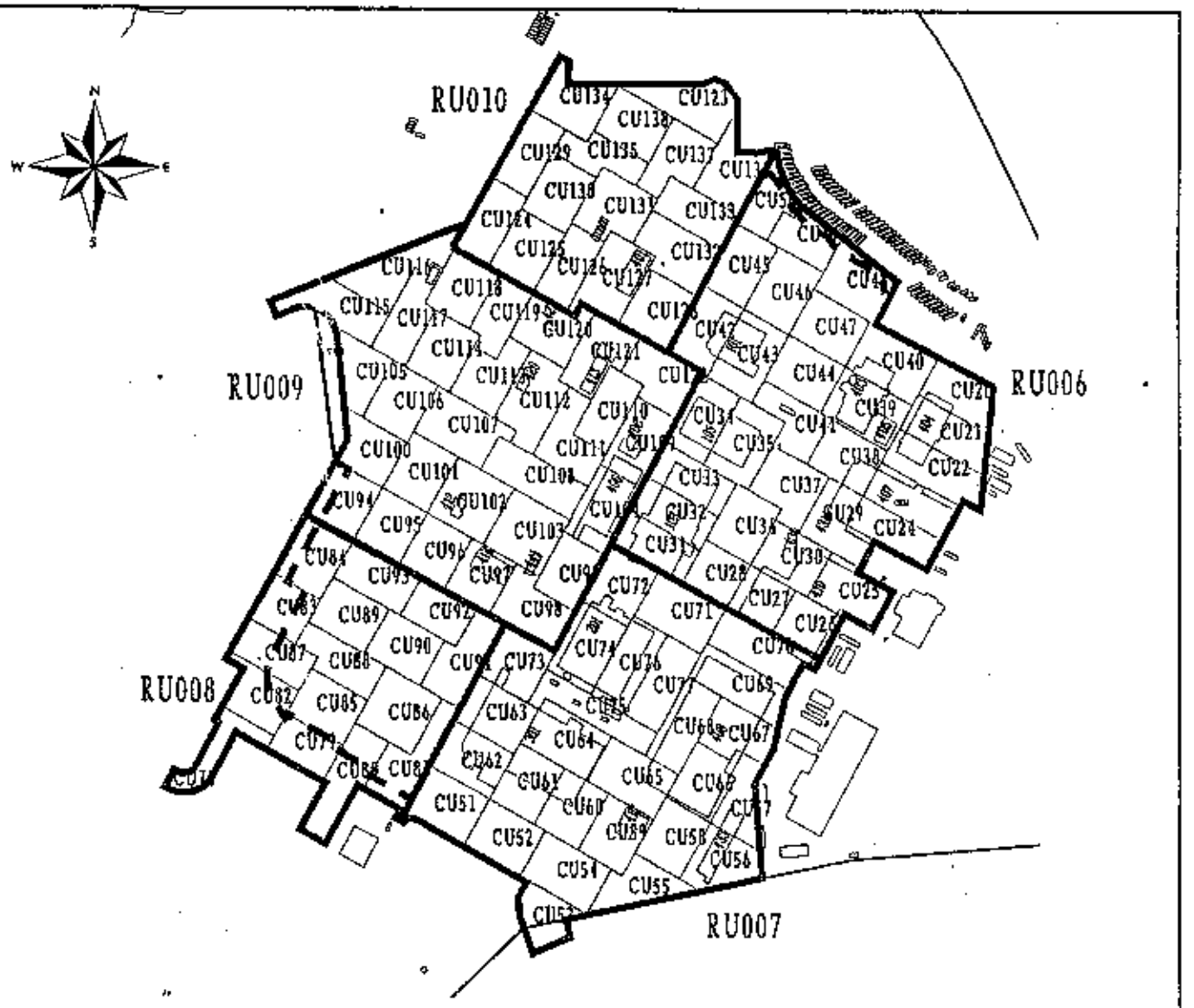

LEGEND

RU006 -- CU020 THRU CU050
RU007 -- CU051 THRU CU077
RU008 -- CU078 THRU CU093
RU009 -- CU094 THRU CU122, CU142
RU010 -- CU123 THRU CU138

Remedial Units for WP-420

Figure: 1-2

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ORIGINATOR:	MGL	DRAWN BY:	LGB	DATE:	03/97

The entire remediation and confirmation process included: characterization data review, contaminants of concern (COC) identification, confirmation plan development, pre-excavation activities, soil excavation, structures removal, radiological walkover surveys, confirmation sampling, oversight activities, sample analysis, analytical data review, quality assurance/quality control (QA/QC) review, completing disposition forms, summary of findings, and conclusions for the post-remedial action reports.

Removal of chemical plant area foundations and contaminated soils was conducted in accordance with the WP-420 Foundations and Contaminated Soils Removal Subcontract (Ref. 8). The confirmation sampling process was conducted in accordance with the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 5), to document the attainment of cleanup standards set forth in the *Record of Decision for Remedial Action at the Chemical Plant Area of the Weldon Spring Site* (ROD) (Ref. 3). The walkovers and sampling details are presented in the *Confirmation Sampling Plan Details for the Chemical Plant Area Foundations and Contaminated Soils Removal (WP-420)* (Ref. 4). Sections 3, 4, and 5 describe in detail the remediation and confirmation processes.

2. PRE-REMEDIATION ACTIVITIES

2.1 Review of Characterization Data

Contaminants of concern (COC) were determined for each CU by reviewing historical information and characterization results. Historical information consisted of gathering available information regarding building use, and process utility lines. In many CUs, areas that were located beneath the building footprints had limited soil characterization data due to the presence of concrete slabs and foundations. These areas therefore required an alternate method to identify potential COCs. The first step was to review the waste management characterization data from samples collected from the sumps of each building. This information, along with the available soil characterization data, was then combined with the historical process information and waste management practices for each building. This method was designed as a conservative approach to developing a COC list for CUs that have limited characterization data. The full process used for determining COCs is detailed in the *Confirmation Sampling Plan Details For The Chemical Plant Area Foundations and Contaminated Soils Removal (WP-420)* (Ref. 4).

2.2 Contaminants of Concern

COCs were identified from the review of the historical information and characterization data for each of the 14 CUs. COC lists were also developed for sanitary sewer and process utility lines located within some CUs. These COC lists were based on the type of utility line and the COC list identified for that specific CU. Other utilities including potable and fire water lines, electrical lines, and communication lines, were present in some CUs, but were not specifically targeted based on process knowledge. Radiological COCs present at RU8 include: Radium 226 (Ra-226), Radium 228 (Ra-228), Thorium 230 (Th-230), Thorium 232 (Th-232), and Uranium 238 (U-238). Organic COCs present at RU8 included: polychlorinated biphenyls (PCBs). Inorganic COCs present at RU8 included: arsenic, chromium, and lead. The specific COC lists and the associated analytical results for each CU are presented in Section 5.

2.3 Data Quality Objectives

Data Quality Objectives (DQOs) were identified to specify and ensure quality data would support the decision making process throughout remedial activities, including the confirmation process. Confirmation DQOs were developed for sampling and analyzing soils during remediation and for the subsequent data evaluation. The DQOs were designed to make statistically defensible decisions regarding attainment of cleanup standards. Sampling and analytical programs for the WP-420 area were designed in accordance to DQOs stated in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 5).

2.4 Cleanup Standards

The objective of the U.S. Department of Energy's (DOE) as low as reasonably achievable (ALARA) process is to reasonably reduce exposures and risks associated with residual contamination (Ref. 5). The Chemical Plant Area ROD (Ref. 3) established two different sets of cleanup standards; risked-based cleanup criteria and ALARA goals. The ROD states that it is expected that contaminant levels remaining in the soil across the site after remediation will range between the cleanup criteria and the ALARA goals, reaching the goals in most cases (Ref. 3). Remedial activities for RU8 (and all of WP-420) were designed to remove soil where the COC concentrations were present above ALARA goals. Table 2-1 summarizes the cleanup criteria and ALARA goals established in the ROD.

Throughout remedial activities at RU8, COC concentrations were evaluated with the ALARA process. The COC concentration was first applied to the ALARA goal. If the COC concentration was above the ALARA goal, the concentration was compared to the risked-based cleanup criteria. The two sets of cleanup standards were applied at two different stages of the cleanup confirmation process discussed below.

2.5 Confirmation Process

The confirmation process was used to determine, under the remedial guidelines, whether remediation activities had achieved the cleanup standards using the ALARA process. Figure 2-1 shows the confirmation process for remedial activities. The decision making process was developed to specify how the data would be evaluated within the confirmation process. To facilitate this data evaluation, the decision making process was implemented at two stages of the confirmation process.

In the first stage, the decision making process was applied to a specific sample location located within a given CU. The decision making process was refined throughout the remedial activities at the WP-420 area to provide systematic steps to determine the need for further remediation of contaminated areas.

In the second stage, the decision making process was applied to a CU as a whole and was specific to a group of sample locations. This was completed to meet project DQOs and the cleanup standards, and to evaluate whether a CU area had been remediated to the extent required by the ROD.

2.5.1 Decision Making Process

The decision making process consisted of four steps that were utilized to determine whether a specific contaminated area (either sample location or a CU) would require further

TABLE 2-1 Radionuclide and Chemical Contaminant Cleanup Standards

	SURFACE[c]		SUBSURFACE[d]	
RADIONUCLIDE (pCi/g)	**ALARA**	**CRITERIA**	**ALARA**	**CRITERIA**
Radium-226[a,b]	5.0	6.2	5.0	16.2
Radium-228[a,b]	5.0	6.2	5.0	16.2
Thorium-230[a]	5.0	6.2	5.0	16.2
Thorium-232[a]	5.0	6.2	5.0	16.2
Uranium-238	30.0	120	30	120
Chemical (mg/kg)				
Arsenic	45	75	75	750
Chromium (total)	90	110	110	1,110
Chromium (VI)	90	100	100	1,000
Lead	240	450	450	4,500
Thallium	16	20	20	200
PAHs[e]	0.44	5.6	5.6	56
PCBs[f]	0.65	8	8	80
TNT	14	140	140	1,400

[a] If both Th-230 and Ra-226, or both Th-232 and Ra-228, are present and not in secular equilibrium, the cleanup criterion applies for the radionuclide with the higher concentration.

[b] At locations where both Ra-226 and Ra-228 are present, the cleanup criterion of 6.2 pCi/g (including background) in the top 15 cm (6 in.) of soil, and 16.2 pCi/g (including background) in each 15-cm (6-in.) layer of soil more than 15 cm (6-in.) below the surface, applies to the sum of the concentrations of these two radionuclides.

[c] Values listed for surface soils apply to contamination within the upper 15 cm (6 in.) of the soil column.

[d] Values for subsurface apply to contamination in soils below 15 cm (6 in.), unless otherwise noted.

[e] Benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, and ideno(1,2,3-cd)pyrene.

[f] Aroclor 1248, Aroclor 1254, Aroclor 1260.

Source: *Record of Decision for Remedial Action at the Chemical Plant Area of the Weldon Spring Site* (Ref. 3)

remediation. The first three steps, part of Stage 1, were applied to specific sample locations which had results greater than criteria. The fourth step, part of Stage 2, was applied to an entire CU, in instances where the preliminary analytical results indicated a COC concentration was above the ALARA goals. The four steps are discussed in detail below and will be referenced in the CU discussions presented in Section 5.

1. If a given COC concentration (in a hot spot area of any given size) was above three times the cleanup criteria, the area was further remediated and resampled.
2. If a given COC concentration (in a hot spot area greater than 25 m^2 (270 ft^2) in size) ranged between criteria and three times criteria, the area was further remediated and resampled.
3. If a given COC concentration (in a hot spot area less than 25 m^2 (270 ft^2) in size) was between the cleanup criteria and three times the cleanup criteria, the following formula was used to determine the acceptable concentration for the COC.

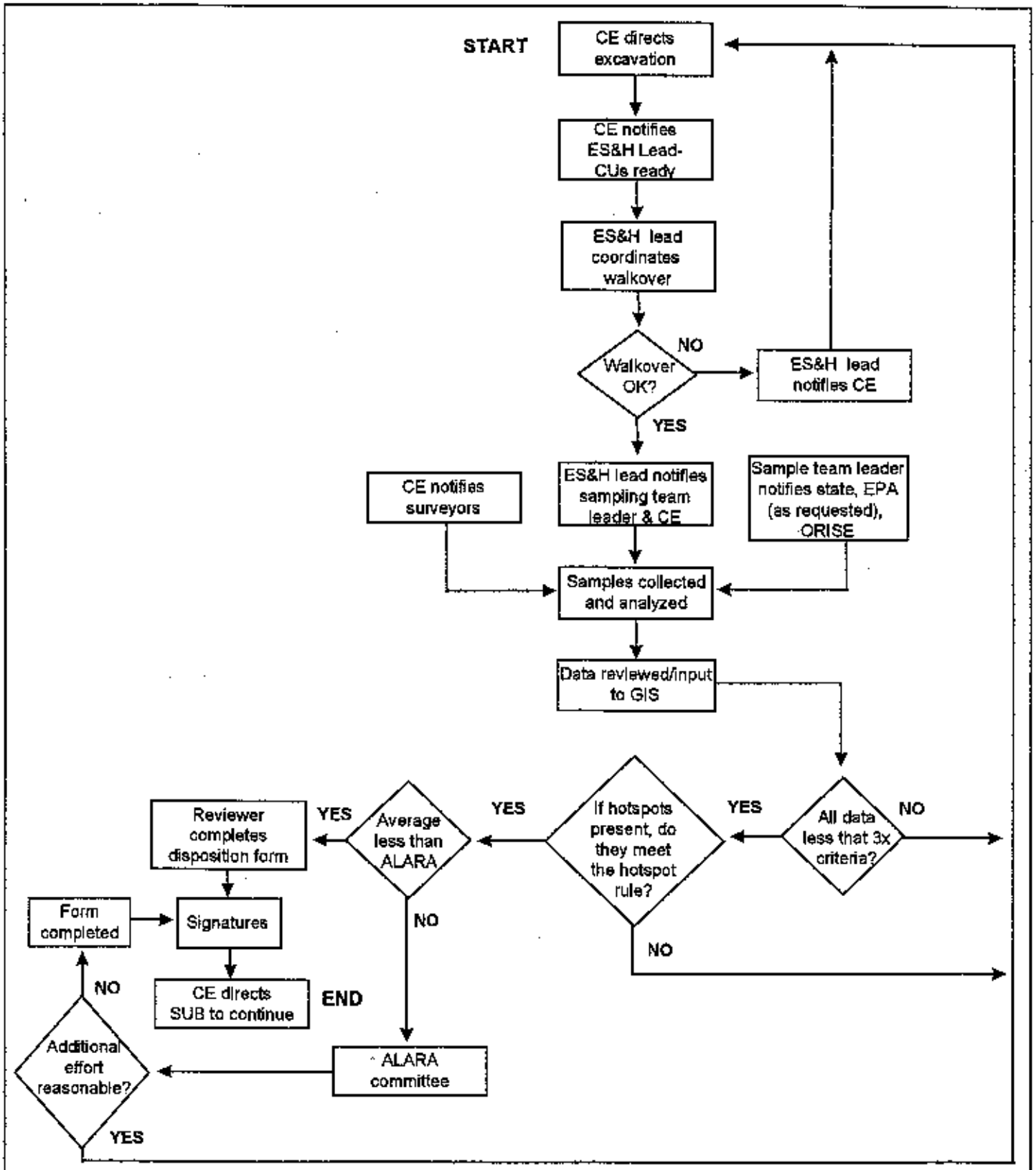
   Maximum Concentration = (Cleanup Criteria) x $(100/A)^{1/2}$

   Where: A = area of hot spot in square meters (m^2).

   If the COC sample concentration was above the maximum concentration, the area was further remediated and resampled. If the COC sample concentration was below the maximum concentration, the soil was left in place and no further remediation was conducted.

4. The fourth step was applied to a specific COC concentration over the entire CU. If an average concentration of a COC within a CU was greater than ALARA, the issue went before the ALARA committee for a decision ruling. Factors considered in the decision ruling included: the percentage of confirmation results to date that were less than, or greater than the ALARA goal, location, cost of further remediation, etc. Based on these factors, the ALARA committee determined whether additional remediation was required.

Contaminant levels remaining in soils across the site after remediation are expected to range between the ALARA goal and cleanup criteria, reaching the goals in most cases.



CLEANUP CONFIRMATION PROCESS		
FIGURE 2-1		
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3. REMEDIAL PROGRAM ACTIVITIES

3.1 Pre-Excavation Activities

Throughout RU8 remediation activities, water management was required that included surface water control and field dewatering of excavations. Surface water was prevented from entering the area using berms and ditches. Surface water run-off within RU8 was routed to established site water management facilities. Water entering excavations from precipitation events and infiltration was pumped to designated excavations serving as interim retention basins. This water was then sampled for total uranium. After review of sample results, these excavations were then dewatered and the water directed to the appropriate site facility depending on the total uranium concentration.

3.2 Excavation Activities

Process and non-process building foundations, underground utilities and storage tanks, miscellaneous surface and subsurface features, and soil were excavated during field activities. The majority of these materials were removed because of contamination. Additional removal of facilities was necessary to support subsequent disposal cell construction. After the initial excavations were completed, radiological walkover surveys were conducted to evaluate the need for additional excavation. Walkover surveys were conducted using a 5 cm by 5 cm (2 in. x 2 in.) sodium iodide (NaI) scintillation detector. When radiological walkover surveys indicated no additional excavation was needed (i.e., no radioactivity levels exceeding 1.5 times the background level), the area was released for confirmation sampling.

Confirmation results were then reviewed and additional excavation and confirmation sampling was conducted in hot spot areas if necessary. Additional excavation and sampling continued until sample results indicated the cleanup standards were achieved. After achieving the ROD cleanup standards, a Disposition Form was completed using preliminary analytical results. The Disposition Form was reviewed and signed by project personnel. The CU was then released for unrestricted use.

3.3 Contaminated Materials Management

Contaminated materials removed during remediation activities were segregated and then transported to the appropriate storage area: APSA, MSA, TSA, or Building 434. These contaminated materials will eventually be placed into the on site disposal facility in accordance with the Record of Decision (ROD) (Ref. 3).

3.4 Post Excavation Activities

After a CU was released with a reviewed and signed Disposition Form, the CU was released to the subcontractor for unrestricted activities. The underlying unsuitable soils were excavated down to the top of the Ferrelview Formation (i.e., native soil) as determined by visual observation and backfilled with as needed with soil suitable for construction to design grade in preparation for the construction of the on-site disposal facility.

4. REMEDIAL ACTIVITIES

4.1 Field Activities

Field activities completed during remedial activities were conducted in accordance with procedures stated in the *Confirmation Sampling Plan Details for the Chemical Plant Area Foundations and Contaminated Soils Removal WP-420* (Ref. 4). Field activities were conducted to perform and document sampling objectives within the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 5) while achieving the cleanup standards. All remedial action surveys, sampling, and data review were conducted and documented in accordance with Weldon Spring Site Remedial Action Project (WSSRAP) Environmental Safety and Health (ES&H) procedures and instructions. The applicable procedures are included in Section 8.2.

4.1.1 Walkover Surveys

Radiological walkover surveys were conducted after excavation activities to determine whether adequate cleanup of radiological materials had been completed. Walkover surveys were conducted using a 5 cm by 5 cm (2 in. x 2 in.) sodium iodide (NaI) scintillation detector. Each confirmation unit (CU) was surveyed using radioactivity levels above 1.5 times the background concentrations (of gamma emitting radioactivity) as a general guideline (Ref. 5). Background radioactivity readings were collected each day at the background location at the Weldon Spring site flagpole. The background reading was recorded in counts per minute (cpm) and used for walkover surveys conducted that day. In areas within close proximity to the raffinate pits, lead shielding was added to the detector's sides to reduce the interfering gamma radiation levels given off by the raffinate pits. The bottom of the detector remained unshielded to give an adequate measurement of the surface directly beneath the detector. In cases when a shielded detector was used, the corresponding background reading was also taken with a shielded detector. There was one CU where even the shielded detector did not adequately reduce the nearby gamma interferences. In this instance, informational sample were collected to see if the CU was ready to be confirmed.

Field walkover surveys were conducted within each CU. Walkover surveys where no levels of radioactivity exceeded 1.5 x background levels were documented on a Walkover Survey Results Form. Areas exceeding 1.5 times the background level were further excavated until survey results showed no levels above 1.5 times background. Final survey results for each CU are included in Section 5. Radiation Survey Forms for WP-420 are presented in Appendix B.

4.1.2 Soil Sampling

After the walkovers were completed and documented, soil sampling was conducted within each CU as part of the confirmation process. This process includes several categories of soil samples, such as hot spot, resample, and confirmation samples.

Soil samples locations were chosen based upon a 10 m by 10 m (31 ft x 31 ft) grid. Samples were collected at every node (grid intersection) and some center points. The soil sampling locations for each CU are presented in Appendix A. Node samples are denoted with a '-S' and center point samples are denoted with a '-C'. Sample locations were relocated in the event the original location was not practical or safe. Sample locations that were moved more than 1.8 m (5 ft) were resurveyed.

Alternatively, sample locations were placed every 10 m (31 ft) along utilities (buried sanitary sewer and process lines only) except when existing grid sample locations lie within 1.8 m (5 ft) of a utility line. In these cases, the existing sample location was offset up to 1.8 m (5 ft) to include the area within the utility line corridor.

Analytical suites for each CU were dependent upon the COC list developed from historical information and characterization sample results. If results from these confirmation samples indicated contaminants in the CU met the cleanup standards as presented in the Attainment Plan, no further remediation was conducted and the CU could be released. A Disposition Form was completed and the CU released back to the subcontractor.

Alternatively, if the confirmation results indicated the cleanup standards were not met, additional walkovers and/or sampling were conducted to delineate the area of contamination. These hot spot samples were designated by the suffix '-HS.' If the hot spot sample results and/or walkover surveys determined that the area exceeded the hot spot rule (presented in Section 2.5), then additional excavation was required. Additional confirmation samples were then collected and designated with the suffix '-RS' which designates a resample. Once the cleanup standards were met, a Disposition Form was completed and the CU released back to the subcontractor. The Disposition Forms for each CU are presented in Appendix C.

4.2 Laboratory Activities

Subcontracted off-site laboratories that performed analyses for the WP-420 remediation activities used Contract Laboratory Program (CLP) methodologies. Laboratory activities were conducted in accordance with *Project Management Contractor Quality Assurance Program* (Ref. 6) and *Environmental Quality Assurance Project Plan* (EQAjP) (Ref. 7). Appendix D contains the final analytical results from each CU within RU8. Preliminary and final analytical data were reviewed upon receipt from the laboratory.

4.3 Radiological Contaminants

Radiological soil samples were collected for Ra-226, Ra-228, Th-230, Th-232, and U-238. Most radiological samples were analyzed by the on-site laboratory; however, overflow samples and a portion of Th-230 samples were sent to an off-site laboratory. Preliminary estimated Ra-226 results were used to release CUs. In addition, because Th-232 is in secular equilibrium with Ra-228, the concentrations are considered essentially the same. Both of the issues are further explained in IOC's included in Appendix E.

4.3.1 Chemical Contaminants

Chemical soil samples were collected for the following organic and inorganic chemical analyses: three polychlorinated biphenyls (PCBs), arsenic, chromium, and lead. All samples collected were analyzed by off-site laboratories.

4.4 Verification Activities

The Oak Ridge Institute for Science and Education (ORISE) was contracted by the U.S. Department of Energy (DOE) to verify soil confirmation sampling in the chemical plant area of the Weldon Spring site. Verification activities included independent walkover radiological surveys and the collection and analysis of soil samples to verify proper disposition of CUs. Field verification activities were conducted in accordance with ORISE's Final Survey Plan (Ref. 9). A table summarizing ORISE hot spot information is presented in Appendix F.

4.4.1 Walkover Surveys

ORISE conducted independent walkover radiological surveys in areas that had been confirmed. Walkover surveys were conducted using a 2.5 cm by 2.5 cm (1 in. x 1 in.) sodium iodide (NaI) scintillation detector. Walkover surveys were conducted to verify field results obtained by WSSRAP personnel.

4.4.2 Soil Sampling

ORISE conducted independent collection and analyses of soil samples. Soil samples were collected at random locations and from areas identified by walkover surveys. Soil sampling was conducted to also verify proper disposition of the CUs.

4.4.3 Verification of WP420 Documentation

All ORISE verification and audit activities have been completed. A final verification letter will be prepared by ORISE when the Project Management Contractor's (PMC) Post Remedial Action Report for WP-420 (RU8) is finalized. The ORISE letter will contain verification walkover surveys and soil sampling results. The letter also presents verification that the remedial action objectives were achieved.

5. CONFIRMATION UNIT RESULTS SUMMARY

The following section includes the confirmation unit (CU) analytical results summary for the 14 CUs that are located within RU8 of the WP-420 area. Each summary was generated from data collected during the remediation activities. Each summary includes the location of the CU, a list of COCs, a general discussion of the remedial activities, walkover survey results, a comparison of preliminary and final analytical results, hot spot summary if applicable, and the dates when the CU was released for unrestricted use.

Preliminary data are the initial results immediately available from the laboratory and are subject to change. Final data are the fully reviewed results of the analyses performed. For chemical analyses, the preliminary data and the final data usually remain the same, while radiological data usually change. The reason for this change is due to the fact that analytical methods for some parameters require additional time following homogenization for the regrowth of daughter products, such as is the case for Ra-226.

Tables contained in this section summarize data collected from each CU following the excavation of contaminated materials. Not all data are contained in the tables, excluded are data from hot spot areas where further excavation was required. The tables were compiled using only the data collected that ensured remediation was complete and represent the soils remaining in place after the confirmation unit was released.

Hot spot data and additional information for each CU are contained in the following Appendixes. Sample Location Maps are presented in Appendix A. Radiation Survey Forms WP-420 are presented in Appendix B. Disposition Forms are presented in Appendix C. Complete analytical results are presented in Appendix D (including hot spot data collected prior to additional remediation). Inter-Office Correspondences are included in Appendix E. A summary table of Oak Ridge Institute for Science and Education (ORISE) verification results is presented in Appendix F.

Apparent discrepancies may occur between the number of sample locations in each CU and the number of samples presented in the analytical summary tables (Section 5.2 through 5.15). This is due to the fact that not all locations were sampled for all parameters.

Appendix C contains the disposition forms which used preliminary data. The preliminary data in some cases may differ from the final data presented in Appendix D. These differences may be due to laboratory transcription or reporting errors, which are not corrected until being verified and reviewed. As mentioned earlier Ra-226 preliminary and final data will always differ. The preliminary result is a conservative estimated concentration. The final result is after the necessary radon in-growth period. In most cases, the final result is less than the preliminary results.

5.1 Confirmation Unit Alterations

During WP-420 activities, changes were made to CU boundaries in RU8. The western boundaries of the following CUs were moved to the east: CU82, CU83, CU84, and CU87. The southern boundaries of the following CUs were moved to the north: CU80, and CU81. CU78 and CU79 were eliminated as part of the WP-420 activities and will be confirmed, along with the other deleted areas, at a later date. Changes regarding the boundaries were made in response to the construction of the road used during remedial activities and the location of the interceptor trench along the eastern side of Raffinate Pit 3. An IOC documenting the changes to RU8 was issued and is included in Appendix E. Figure 1-2 also reflects the CU boundary changes.

5.2 Confirmation Unit 80

Confirmation Unit 80 is located in the southeast corner of RU8. The COCs identified for CU80 include U-238, Th-230, Th-232, Ra-226, Ra-228, arsenic, chromium, lead, and PCBs. Utility lines were also removed and confirmation samples were collected. Confirmation Unit 80 was released to the PMC on October 1, 1996 by the subcontractor for confirmation sampling. This CU is being released as a full CU, although the boundaries have been changed. (The remaining area is no longer being confirmed under the WP-420 activities, and will be confirmed under another Work Package, at a later date).

The NaI background reading collected for CU80 was 10,000 cpm (unshielded). All of the final radioactivity levels were less than 1.5 times the background level. The walkover surveys for this CU were conducted on October 1 and October 4, 1996.

Confirmation soil samples were collected at 17 designated locations (see Figure A-1, Appendix A). Three of the predetermined grid sample locations fell within a utility corridor. No additional utility sample locations were added. Table 5-1 presents sample totals, and concentration ranges and averages for the preliminary and final analytical results.

No hot spot areas were identified from sample results, therefore, no additional soil excavation was required. No deviations from the sampling plan occurred at CU80.

Review of the final analytical results supports the preliminary results indicating remedial activities have been completed. The final results meet the cleanup standards as detailed in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 5). After the walkover survey, soil sampling, and remediation activities were completed, Disposition Forms were reviewed and signed. Confirmation Unit 80 was released back to the subcontractor for unrestricted use on October 21, 1996.

TABLE 5-1 Confirmation Unit 80 Analytical Results Summary

Contaminant	Preliminary Results				Final Results			
	No. of Samples	Range	Average	No. Of Samples Above ALARA	No. of Samples	Range	Average	No. of Samples Above ALARA
Arsenic (mg/kg)	3	7.3-34.1	16.57	0	3	7.3-34.1	16.57	0
Chromium (mg/kg)	3	13.4-16.7	15.33	0	3	13.4-16.7	15.33	0
Lead (mg/kg)	3	10.1-18.5	13.70	0	3	10.1-18.5	13.70	0
PCB (mg/kg)	3	0-0.28	0.09	0	3	0-0.28	0.09	0
Radium 226 (pCi/g)	3	2.47-2.75	2.65	0	3	1.35-1.5	1.42	0
Radium 228 (pCi/g)	3	1.03-1.39	1.21	0	3	0.63-1.52	1.06	0
Ra226/Ra228 (pCi/g)	3	3.78-3.94	3.86	0	3	2.04-3.02	2.48	0
Thorium 230 (pCi/g)	5	1.05-1.39	1.16	0	5	1.05-1.39	1.16	0
Thorium 232 (pCi/g)	See Radium 228 Results				See Radium 228 Results			
Uranium 238 (pCi/g)	17	1.43-15.83	4.34	0	17	1.43-15.8	4.11	0

5.3 Confirmation Unit 81

Confirmation Unit 81 is located in the southeast corner of RU8. The COCs identified for CU81 include U-238, Ra-226, and Ra-228. There were no utility corridors located within this CU. Confirmation Unit 81 was released to the PMC on October 3, 1996 by the subcontractor for confirmation sampling. This CU is being released as a full CU, although the boundaries have been changed. (The remaining area is no longer being confirmed under the WP-420 activities, and will be confirmed under another Work Package, at a later date).

The NaI background readings collected for CU81 ranged between 9,400 (unshielded) and 12,000 (unshielded) cpm. All of the final radioactivity levels were less than 1.5 times the background levels. The walkover surveys for this CU were completed on October 3, 1996.

Confirmation soil samples were collected at 29 designated locations (see Figure A-2, Appendix A). Table 5-2 presents sample totals, and concentration ranges and averages for the preliminary and final analytical results.

TABLE 5-2 Confirmation Unit 81 Analytical Results Summary

Contaminant	Preliminary Results				Final Results			
	No. of Samples	Range	Average	No. of Samples Above ALARA	No. of Samples	Range	Average	No. of Samples Above ALARA
Radium 226 (pCi/g)	1	2.63	2.63	0	1	1.39	1.39	0
Radium 228 (pCi/g)	1	1.22	1.22	0	1	0.63	0.63	0
Ra226/Ra228 (pCi/g)	1	3.85	3.85	0	1	2.02	2.02	0
Uranium 238 (pCi/g)	29	1.29-23.07	9.22	0	29	0.73-23.1	8.99	0

One U-238 hot spot area was identified from the sample results at sample location SC-08105-S. The U-238 concentration was above the cleanup criteria. The hot spot area was remediated, additional soil excavation was conducted, and resamples were collected. The analytical resample result indicated that the U-238 resample concentration was below ALARA. The resample result, identified as SC-08105-S-RS, can be found in Appendix D.

Review of the final analytical results supports the preliminary results indicating remedial activities have been completed. The final results meet the cleanup standards as detailed in the Chemical Plant Area Cleanup Attainment Confirmation Plan (Ref. 5). After the walkover survey, soil sampling, and remediation activities were completed, Disposition Forms were reviewed and signed. Confirmation Unit 81 was released back to the subcontractor for unrestricted use on October 21, 1996.

5.4 Confirmation Unit 82

Confirmation Unit 82 is located in the southwest corner of RU8. The only COC identified for CU82 was U-238. There were no utility corridors located within this CU. Confirmation Unit 82 was released to the PMC on September 11, 1996 by the subcontractor for confirmation sampling. This CU is being released as a full CU, although the boundaries have been changed. (The remaining area is no longer being confirmed under the WP-420 activities, and will be confirmed under another Work Package, at a later date.).

The NaI background readings collected for CU82 ranged between 5,800 (shielded) and 6,000 (shielded) cpm. All of the final radioactivity levels were less than 1.5 times the background levels. The walkover surveys for this CU were completed on September 11, 1996.

Confirmation soil samples were collected at 8 designated locations (see Figure A-3, Appendix A). Table 5-3 presents sample totals, and concentration ranges and averages for the preliminary and final analytical results.

TABLE 5-3 Confirmation Unit 82 Analytical Results Summary

Contaminant	Preliminary Results				Final Results			
	No. of Samples	Range	Average	No. of Samples Above ALARA	No. of Samples	Range	Average	No. of Samples Above ALARA
Uranium 238 (pCi/g)	8	1.52-3.66	2.21	0	8	1.52-3.66	2.21	0

No hot spot areas were identified from sample results, therefore, no additional soil excavation was required.

Review of the final analytical results supports the preliminary results indicating remedial activities have been completed. The final results meet the cleanup standards as detailed in the Chemical Plant Area Cleanup Attainment Confirmation Plan (Ref. 5). After the walkover survey, soil sampling, and remediation activities were completed, Disposition Forms were reviewed and signed. Confirmation Unit 82 was released back to the subcontractor for unrestricted use on September 17, 1996.

5.5 Confirmation Unit 83

Confirmation Unit 83 is located on the western boundary of RU8. The only COC identified for CU83 was U-238. There were no utility corridors located within this CU. Confirmation Unit 83 was released to the PMC on September 11, 1996 by the subcontractor for confirmation sampling. This CU is being released as a full CU, although the boundaries have been changed. (The remaining area is no longer being confirmed under the WP-420 activities, and will be confirmed under another Work Package, at a later date).

The NaI background readings collected for CU83 ranged between 5,800 (shielded) and 6,000 (shielded) cpm. All of the final radioactivity levels were less than 1.5 times the background levels. The walkover surveys for this CU were completed on September 11, 1996.

Confirmation soil samples were collected at 10 designated locations (see Figure A-4, Appendix A). Table 5-4 presents sample totals, and concentration ranges and averages for the preliminary and final analytical results.

No hot spot areas were identified from sample results, therefore, no additional soil excavation was required. No deviations from the sampling plan occurred at CU83.

TABLE 5-4 Confirmation Unit 83 Analytical Results Summary

Contaminant	Preliminary Results				Final Results			
	No. of Samples	Range	Average	No. of Samples Above ALARA	No. of Samples	Range	Average	No. of Samples Above ALARA
Uranium 238 (pCi/g)	10	1.76-5.21	3.12	0	10	1.76-5.21	3.12	0

Review of the final analytical results supports the preliminary results indicating remedial activities have been completed. The final results meet the cleanup standards as detailed in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 5). After the walkover survey, soil sampling, and remediation activities were completed, Disposition Forms were reviewed and signed. Confirmation Unit 83 was released back to the subcontractor for unrestricted use on September 17, 1996.

5.6 Confirmation Unit 84

Confirmation Unit 84 is located in the northwest corner of RU8. The COCs identified for CU84 include U-238 and Th-230. There were no utility corridors located within this CU. Confirmation Unit 84 was released to the PMC on October 3, 1996 by the subcontractor for confirmation sampling. This CU is being released as a full CU, although the boundaries have been changed. (The remaining area is no longer being confirmed under the WP-420 activities, and will be confirmed under another Work Package, at a later date).

The NaI background readings collected for CU84 ranged between 4,000 (shielded) and 5,500 (shielded) cpm. The walkovers were conducted on October 3, 1996. Due to the close proximity of Raffinate Pit 3, which is a relatively large low-level gamma emitting source, walkover surveys were unsuccessful even with the shielded NaI detector, but final radioactivity levels were greater than 1.5 times the background levels. Some informational soil samples were collected in the areas with the highest gamma readings to compensate for the walkovers and determine if confirmation samples could be collected. These results were less than ALARA, therefore confirmation sampling could begin.

Confirmation soil samples were collected at 26 designated locations (see Figure A-5, Appendix A). Table 5-5 presents sample totals, and concentration ranges and averages for the preliminary and final analytical results.

TABLE 5-5 Confirmation Unit 84 Analytical Results Summary

Contaminant	Preliminary Results				Final Results			
	No. of Samples	Range	Average	No. of Samples Above ALARA	No. of Samples	Range	Average	No. of Samples Above ALARA
Thorium 230 (pCi/g)	10	1.12-5.65	2.35	1	10	1.12-5.65	2.35	1
Uranium 238 (pCi/g)	25	1.61-6.21	2.94	0	25	1.61-6.21	2.94	0

Review of the final analytical results supports the preliminary results indicating remedial activities have been completed. The final results meet the cleanup standards as detailed in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 5). After the walkover survey, soil sampling, and remediation activities were completed, Disposition Forms were reviewed and signed. Confirmation Unit 84 was released back to the subcontractor for unrestricted use on October 9, 1996.

After the CU was released, ORISE identified two areas located within CU084 with elevated gamma readings during their walkover surveys. The first area, located near SC-08414-S, was sampled and results were less than criteria. No additional excavation was required. The second area, located near SC-08419-S, was sampled and results were greater than three times criteria. After excavation, field instrument readings remained elevated, therefore 4 additional samples were collected. U-238 and Th-230 sample results remained elevated and additional excavation was conducted. During excavation, it was determined that this area was part of an old drainage. Therefore, in order to determine if this was an isolated case, a test pit (2 m by 2 m by 1 m) (6.2 ft x 6.2 ft x 3.1 ft) was dug approximately 3 to 4 m (10 to 14 ft) to the east of the original area.

Due to continued elevated readings, the hot spot area was no longer considered an isolated case. A decision was made by the ALARA committee to continue excavating test pits along this drainage every 15m (50 feet) to determine the extent of contamination. Excavation continued 30m (100 feet) east of the test pit at which point the meter readings were background. The last test pit was located in CU089. Five confirmation soil samples were then collected every 10 m (31 ft) along the excavated portion of the drainage (using the procedure for sampling utility corridors) and analyzed for radiological COCs. Samples were identified as SC-08401-U, SC-08402-U, SC-08403-U, SC-08901-U, and SC-08902-U. Results for these five samples

indicated concentrations were below ALARA. An IOC detailing this hot spot area is included in Appendix E. These results did not change the original disposition of either CU.

5.7 Confirmation Unit 85

Confirmation Unit 85 is located in the central portion of RU8. The only COC identified for CU85 was U-238. There were no utility corridors located within this CU. Confirmation Unit 85 was released to the PMC in September 1996 by the subcontractor for confirmation sampling. This CU was released in two stages, a partial area release and the remainder area release. The final Disposition Form is inclusive of both areas.

The NaI background readings collected for CU85 ranged between 5,800 (shielded) and 6,000 (shielded) cpm. All of the final radioactivity levels were less than 1.5 times the background levels. The walkover surveys for this CU were completed on September 11, 1996.

Confirmation soil samples were collected at 30 designated locations (see Figure A-6, Appendix A). Table 5-6 presents sample totals, and concentration ranges and averages for the preliminary and final analytical results.

TABLE 5-6 Confirmation Unit 85 Analytical Results Summary

Contaminant	Preliminary Results				Final Results			
	No. of Samples	Range	Average	No. of Samples Above ALARA	No. of Samples	Range	Average	No. of Samples Above ALARA
Uranium 238 (pCi/g)	30	1.66-8.32	3.19	0	30	1.66-8.32	3.19	0

No hot spot areas were identified from sample results, therefore no additional soil excavation was required.

Review of the final analytical results supports the preliminary results indicating remedial activities have been completed. The final results meet the cleanup standards as detailed in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 5). After the walkover survey, soil sampling, and remediation activities were completed, Disposition Forms were reviewed and signed. Confirmation Unit 85 was released back to the subcontractor for unrestricted use on September 13, 1996.

After the CU was released, ORISE identified a hot spot area located on the border of CU85 and CU80 during their walkover survey. The initial hot spot area had an approximate size measuring 1 m by 1 m (3.1 ft x 3.1 ft) and was north of sample ID SC-08004-S. No samples

were collected based on the visible yellowcake observed. This area was further excavated and surveyed until readings were less than 1.5 times background. A sample was collected (SC-08004-S-RS01) and results were less than ALARA. These results are presented in Appendix D.

5.8 Confirmation Unit 86

Confirmation Unit 86 is located in the east-central portion of RU8. The COCs identified for CU86 include U-238, Th-230, Ra-226, Ra-228, arsenic, chromium, lead, and PCBs. Utility lines were also removed and confirmation samples were collected. Confirmation Unit 86 was released to the PMC on October 3, 1996 by the subcontractor for confirmation sampling.

The NaI background readings collected for CU86 ranged between 9,400 (unshielded) and 12,000 (unshielded) cpm. All of the final radioactivity levels were less than 1.5 times the background levels. The walkover surveys for this CU were completed on October 3, 1996.

Confirmation soil samples were collected at 37 designated locations (see Figure A-7, Appendix A). Table 5-7 presents sample totals, and concentration ranges and averages for the preliminary and final analytical results.

TABLE 5-7 Confirmation Unit 86 Analytical Results Summary

Contaminant	Preliminary Results				Final Results			
	No. of Samples	Range	Average	No. of Samples Above ALARA	No. of Samples	Range	Average	No. of Samples Above ALARA
Arsenic (mg/kg)	6	5.4-34.1	11.43	0	6	5.4-34.1	11.43	0
Chromium (mg/kg)	6	12.4-17.2	14.77	0	6	12.4-17.2	14.77	0
Lead (mg/kg)	6	10.6-20.5	14.57	0	6	10.6-20.5	14.57	0
PCB (mg/kg)	11	0-5.8	1.06	5	11	0-5.8	1.06	5
Radium 226 (pCi/g)	6	2.32-2.5	2.42	0	6	1.3-1.57	1.46	0
Radium 228 (pCi/g)	6	1.03-1.41	1.26	0	6	0.83-1.49	1.10	0
Ra226/Ra228 (pCi/g)	6	3.5-3.86	3.68	0	6	2.02-3.02	2.56	0

TABLE 5-7 Confirmation Unit 86 Analytical Results Summary (Continued)

	Preliminary Results				Final Results			
Contaminants	No. of Samples	Range	Average	No. of Samples Above ALARA	No. of Samples	Range	Average	No. of Samples Above ALARA
Thorium 230 (pCi/g)	6	0.91-1.39	1.07	0	6	0.91-1.39	1.07	0
Uranium 238 (pCi/g)	36	1.55-23.07	8.30	0	36	0.73-23.1	7.97	0

One U-238 hot spot area was identified from sample results at SC-08105-S which exceeded criteria. The area was further excavated and resampled (SC-08105-S-RS). The U-238 resample result was less than ALARA.

Because the PCB average concentration for CU86 was above ALARA, the ALARA committee met. Based on the total percentage of sample results below ALARA collected to date (i.e. more than 50% of the samples were less than ALARA), the CU was released and no additional remediation was required.

Review of the final analytical results supports the preliminary results indicating remedial activities have been completed. The final results meet the cleanup standards as detailed in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 5). After the walkover survey, soil sampling, and remediation activities were completed, Disposition Forms were reviewed and signed. Confirmation Unit 86 was released back to the subcontractor for unrestricted use on October 18, 1996.

5.9 Confirmation Unit 87

Confirmation Unit 87 is located on the western boundary of RU8. The only COC identified for CU87 was U-238. There were no utility corridors located within this CU. Confirmation Unit 87 was released to the PMC on September 11, 1996 by the subcontractor for confirmation sampling. This CU is being released as a full CU, although the boundaries have been changed. (The remaining area is no longer being confirmed under the WP-420 activities, and will be confirmed under another Work Package, at a later date).

The NaI background readings collected for CU87 ranged between 5,800 (shielded) and 6,000 (shielded) cpm. All of the final radioactivity levels were less than 1.5 times the background levels. The walkover surveys for this CU were completed on September 11, 1996.

Confirmation soil samples were collected at 16 designated locations (see Figure A-8, Appendix A). Table 5-8 presents sample totals, and concentration ranges and averages for the preliminary and final analytical results.

TABLE 5-8 Confirmation Unit 87 Analytical Results Summary

Contaminant	Preliminary Results				Final Results			
	No. of Samples	Range	Average	No. of Samples Above ALARA	No. of Samples	Range	Average	No. of Samples Above ALARA
Uranium 238 (pCi/g)	16	1.52-5.21	2.35	0	16	1.52-5.21	2.44	0

No hot spot areas were identified from sample results, therefore no additional soil excavation was required. No deviations from the sampling plan occurred at CU87.

Review of the final analytical results supports the preliminary results indicating remedial activities have been completed. The final results meet the cleanup standards as detailed in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 5). After the walkover survey, soil sampling, and remediation activities were completed, Disposition Forms were reviewed and signed. Confirmation Unit 87 was released back to the subcontractor for unrestricted use on September 17, 1996.

5.10 Confirmation Unit 88

Confirmation Unit 88 is located in the central portion of RU8. The only COC identified for CU88 was U-238. There were no utility corridors located within this CU. Confirmation Unit 88 was released to the PMC in September 1996 by the subcontractor for confirmation sampling.

The NaI background readings collected for CU88 ranged between 5,300 (shielded) and 6,100 (shielded) cpm. All of the final radioactivity levels were less than 1.5 times the background levels. The walkover surveys for this CU were completed on September 12, 1996.

Confirmation soil samples were collected at 30 designated locations (see Figure A-9, Appendix A). Table 5-9 presents sample totals, and concentration ranges and averages for the preliminary and final analytical results.

TABLE 5-9 Confirmation Unit 88 Analytical Results Summary

Contaminant	Preliminary Results				Final Results			
	No. of Samples	Range	Average	No. of Samples Above ALARA	No. of Samples	Range	Average	No. of Samples Above ALARA
Uranium 238 (pCi/g)	30	1.61-4.28	2.62	0	30	1.61-4.28	2.62	0

No hot spot areas were identified from sample results, therefore no additional soil excavation was required. No deviations from the sampling plan occurred at CU88.

Review of the final analytical results supports the preliminary results indicating remedial activities have been completed. The final results meet the cleanup standards as detailed in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 5). After the walkover survey, soil sampling, and remediation activities were completed, Disposition Forms were reviewed and signed. Confirmation Unit 88 was released back to the subcontractor for unrestricted use on September 17, 1996.

5.11 Confirmation Unit 89

Confirmation Unit 89 is located in the central portion of RU8. The only COC identified for CU89 was U-238. There were no utility corridors located within this CU. Confirmation Unit 89 was released to the PMC on September 11, 1996 by the subcontractor for confirmation sampling.

The NaI background readings collected for CU89 ranged between 5,300 (shielded) and 6,000 (shielded) cpm. All of the final radioactivity levels were less than 1.5 times the background levels. The walkover surveys for this CU were completed on September 11, 1996.

Confirmation soil samples were collected at 30 designated locations (see Figure A-10, Appendix A). Table 5-10 presents sample totals, and concentration ranges and averages for the preliminary and final analytical results.

Review of the final analytical results supports the preliminary results indicating remedial activities have been completed. The final results meet the cleanup standards as detailed in the Chemical Plant Area Cleanup Attainment Confirmation Plan (Ref. 5). After the walkover survey, soil sampling, and remediation activities were completed, Disposition Forms were reviewed and signed. Confirmation Unit 89 was released back to the subcontractor for unrestricted use on September 17, 1996.

TABLE 5-10 Confirmation Unit 89 Analytical Results Summary

Contaminant	Preliminary Results				Final Results			
	No. of Samples	Range	Average	No. of Samples Above ALARA	No. of Samples	Range	Average	No. of Samples Above ALARA
Uranium 238 (pCi/g)	30	1.45-5.56	2.74	0	30	1.45-5.56	2.74	0

After the CU was released, ORISE identified a small hot spot area located within CU084 during their walkover survey. The initial hot spot area had an approximate size measuring 1 m by 1 m (3.1 ft x 3.1 ft). After excavation, field instrument readings remained elevated, therefore 4 additional samples were collected. U-238 and Th-230 sample results remained elevated and additional excavation was conducted. During the excavating, it was determined that the area was part of an old drainage. Therefore, in order to determine if this was an isolated case, a test pit (2 m by 2 m by 1 m) (6.2 ft x 6.2 ft x 3.1 ft) was dug approximately 3 to 4 m (9.3 to 12.4 ft) to the east of the original area.

Due to continued elevated readings, the hot spot area was no longer considered an isolated case. A decision was made by the ALARA committee, to continue excavating test pits along this drainage every 15 m (50 feet) to determine the extent of contamination. Excavation continued 30 m (100 feet) east of the test pit at which point the meter readings were background. The last test pit was located in CU089. Five confirmation soil samples were then collected every 10 m (31 ft) along the excavated portion of the drainage (using the procedure for sampling utility corridors) and analyzed for radiological contaminants of concern. Samples were identified as SC-08401-U, SC-08402-U, SC-08403-U, SC-08901-U, and SC-08902-U. Results for these five samples were below surface ALARA. An IOC detailing this hot spot area is included in Appendix E. These results did not change the original disposition of either CU.

5.12 Confirmation Unit 90

Confirmation Unit 90 is located in the central portion of RU8. The COCs identified for CU90 include U-238, Th-230, Ra-226, Ra-228, arsenic, chromium, lead, and PCBs. Utility lines were also removed and confirmation samples were collected. Confirmation Unit 90 was released to the PMC on October 4, 1996 by the subcontractor for confirmation sampling.

The NaI background readings collected for CU90 ranged between 10,000 (unshielded) and 10,600 (unshielded) cpm. All of the final radioactivity levels were less than 1.5 times the background levels. The walkover surveys for this CU were completed on October 4, 1996.

Confirmation soil samples were collected at 30 designated locations (see Figure A-11, Appendix A). Five of the predetermined grid sample locations fell within the utility corridor. No additional utility sample locations were added. Table 5-11 presents sample totals, and concentration ranges and averages for the preliminary and final analytical results.

TABLE 5-11 Confirmation Unit 90 Analytical Results Summary

Contaminant	Preliminary Results				Final Results			
	No. of Samples	Range	Average	No. of Samples Above ALARA	No. of Samples	Range	Average	No. of Samples Above ALARA
Arsenic (mg/kg)	5	4.7-16.9	10.62	0	5	4.7-16.9	10.62	0
Chromium (mg/kg)	5	16.7-22.3	18.34	0	5	16.7-22.3	18.34	0
Lead (mg/kg)	5	16.5-27.3	21.42	0	5	16.5-27.3	21.42	0
PCB (mg/kg)	5	0	N/A	0	5	0	N/A	0
Radium 226 (pCi/g)	5	2.07-2.41	2.30	0	5	1.28-1.66	1.45	0
Radium 228 (pCi/g)	5	0.59-1.77	1.25	0	5	1.11-1.66	1.40	0
Ra226/Ra228 (pCi/g)	5	2.99-3.84	3.55	0	5	2.6-3.11	2.85	0
Thorium 230 (pCi/g)	5	0.91-1.35	1.07	0	5	0.91-1.34	1.06	0
Uranium 238 (pCi/g)	30	1.57-16.19	4.59	0	30	1.57-16.2	4.60	0

N/A Average not applicable

No hot spot areas were identified from sample results, therefore, no additional soil excavation was required. No deviations from the sampling plan occurred at CU90.

Review of the final analytical results supports the preliminary results indicating remedial activities have been completed. The final results meet the cleanup standards as detailed in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 5). After the walkover survey, soil sampling, and remediation activities were completed, Disposition Forms were reviewed and signed. Confirmation Unit 90 was released back to the subcontractor for unrestricted use on October 11, 1996.

5.13 Confirmation Unit 91

Confirmation Unit 91 is located in the northeast corner of RU8. The only COC identified for CU91 was U-238. There are no utility corridors located within this CU. Confirmation Unit 91 was released to the PMC on October 9, 1996 by the subcontractor for confirmation sampling.

The NaI background readings collected for CU91 ranged between 10,000 (unshielded) and 11,000 (unshielded) cpm. All of the final radioactivity levels were less than 1.5 times the background levels. The walkover surveys for this CU were completed on October 9, 1996.

Confirmation soil samples were collected at 32 designated locations (see Figure A-12, Appendix A). Table 5-12 presents sample totals, and concentration ranges and averages for the preliminary and final analytical results.

TABLE 5-12 Confirmation Unit 91 Analytical Results Summary

Contaminant	Preliminary Results				Final Results			
	No. of Samples	Range	Average	No. of Samples Above ALARA	No. of Samples	Range	Average	No. of Samples Above ALARA
Uranium 238 (pCi/g)	32	1.59-23.07	9.02	0	32	1.59-23.1	9.02	0

No hot spot areas were identified from sample results, therefore no additional soil excavation was required. No deviations from the sampling plan occurred at CU91.

Review of the final analytical results supports the preliminary results indicating remedial activities have been completed. The final results meet the cleanup standards as detailed in the Chemical Plant Area Cleanup Attainment Confirmation Plan (Ref. 5). After the walkover survey, soil sampling, and remediation activities were completed, Disposition Forms were reviewed and signed. Confirmation Unit 91 was released back to the subcontractor for unrestricted use on October 16, 1996.

5.14 Confirmation Unit 92

Confirmation Unit 92 is located in the northeast corner of RU8. The COCs identified for CU92 include U-238, Th-230, Ra-226, Ra-228, arsenic, chromium, lead, and PCBs. Utility lines were also removed and confirmation samples were collected. Confirmation Unit 92 was released to the PMC on October 9, 1996 by the subcontractor for confirmation sampling.

The NaI background readings collected for CU92 ranged between 10,000 (unshielded) and 10,500 (unshielded) cpm. All of the final radioactivity levels were less than 1.5 times the background levels. The walkover surveys for this CU were completed on October 9, 1996.

Confirmation soil samples were collected at 24 designated locations (see Figure A-13, Appendix A). Four of the predetermined grid sample locations fell within the utility corridor. No additional utility sample locations were added. Table 5-13 presents sample totals, and concentration ranges and averages for the preliminary and final analytical results.

TABLE 5-13 Confirmation Unit 92 Analytical Results Summary

Contaminant	Preliminary Results				Final Results			
	No. of Samples	Range	Average	No. of Samples Above ALARA	No. of Samples	Range	Average	No. of Samples Above ALARA
Arsenic (mg/kg)	4	6.2-16.9	10.10	0	4	6.2-16.9	10.10	0
Chromium (mg/kg)	4	17.3-19.5	18.43	0	4	17.3-19.5	18.43	0
Lead (mg/kg)	4	13.9-23.8	17.08	0	4	13.9-23.8	17.08	0
PCB (mg/kg)	4	0	N/A	0	4	0	N/A	0
Radium 226 (pCi/g)	4	2.13-2.66	2.44	0	4	1.32-1.64	1.45	0
Radium 228 (pCi/g)	4	1.17-1.58	1.40	0	4	1.07-1.51	1.31	0
Ra226/Ra228 (pCi/g)	4	3.55-4.24	3.84	0	4	2.44-2.98	2.76	0
Thorium 230 (pCi/g)	4	0.75-2.25	1.40	0	4	0.93-1.08	0.99	0
Uranium 238 (pCi/g)	24	1.47-13.51	3.79	0	24	1.47-13.5	3.80	0

N/A Average not applicable

No hot spot areas were identified from sample results, therefore no additional soil excavation was required. No deviations from the sampling plan occurred at CU93.

Review of the final analytical results supports the preliminary results indicating remedial activities have been completed. The final results meet the cleanup standards as detailed in the Chemical Plant Area Cleanup Attainment Confirmation Plan (Ref. 5). After the walkover survey, soil sampling, and remediation activities were completed, Disposition Forms were reviewed and

signed. Confirmation Unit 92 was released back to the subcontractor for unrestricted use on October 17, 1996.

5.15 Confirmation Unit 93

Confirmation Unit 93 is located along the northern edge of RU8. The only COC identified for CU93 was U-238. There were no utility corridors located within this CU. Confirmation Unit 93 was released to the PMC on September 11, 1996 by the subcontractor for confirmation sampling.

The NaI background readings collected for CU93 ranged between 5,200 (shielded) and 6,000 (shielded) cpm. All of the final radioactivity levels were less than 1.5 times the background levels. The walkover surveys for this CU were completed on September 11, 1996.

Confirmation soil samples were collected at 28 designated locations (see Figure A-14, Appendix A). Table 5-14 presents sample totals, and concentration ranges and averages for the preliminary and final analytical results.

TABLE 5-14 Confirmation Unit 93 Analytical Results Summary

Contaminant	Preliminary Results				Final Results			
	No. of Samples	Range	Average	No. of Samples Above ALARA	No. of Samples	Range	Average	No. of Samples Above ALARA
Uranium 238 (pCi/g)	28	1.52-6.21	2.39	0	28	1.52-6.21	2.39	0

No hot spot areas were identified from sample results, therefore no additional soil excavation was required. No deviations from the sampling plan occurred at CU93.

Review of the final analytical results supports the preliminary results indicating remedial activities have been completed. The final results meet the cleanup standards as detailed in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 5). After the walkover survey, soil sampling, and remediation activities were completed, Disposition Forms were reviewed and signed. Confirmation Unit 93 was released back to the subcontractor for unrestricted use on September 17, 1996.

6. DATA EVALUATION

Data evaluation was performed on WP-420 final analytical data to determine whether data quality objectives developed for the Weldon Spring Site Remedial Action Project (WSSRAP) were met and to ensure overall data quality results were generated from RU8 remedial activities. Data evaluation was performed in accordance with the *Project Management Contractor Quality Assurance Program* (QAP) (Ref. 6) and the *Environmental Quality Assurance Project Plan* (Ref. 7). The data evaluation process was completed by data verification, data review, data validation, and data management and reduction activities as stated in the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 5).

6.1 Data Verification

Data verification was conducted to ensure that documentation and data were reported in compliance with established reporting requirements and standard operating procedures (SOPs), and to ensure that all analyses were performed. All analytical results received from the laboratory were reviewed to verify samples were properly handled according to WSSRAP protocol. The following factors were reviewed and evaluated: sample identification, chain-of custody, holding times, sample preservation requirements, Sample Analysis Request Forms, data reviews, laboratory tracking, data reporting requirements, and the database transfer.

6.2 Data Review

Data review was conducted to ensure the final data were properly identified, analyzed, reported, and met data quality requirements (DQRs). Copies of the data packages were reviewed by the data users. The data were reviewed to check for inconsistencies with the field quality control (QC) samples and with data quality requirements. Final analytical results were also compared to the preliminary analytical results.

A data comparison of quality control samples to DQR goals was also performed to assess the precision, accuracy, and completeness of the data and to identify samples that may require further validation activities. This comparison was conducted in addition to the 10% data validation activities and is inclusive of all analytical results from quality control samples generated from RU8 activities. The tables, including the comparison of quality assurance/quality control (QA/QC) samples to the parent sample, are presented in Appendix G. Tables including the complete quality control comparison are presented in Appendix H. The following text discusses the review of DQRs.

Specific DQRs for the WSSRAP were developed according to U. S. Environmental Protection Agency (EPA) guidance. These site-specific DQRs include precision, accuracy, and

completeness goals for data collection activities. Each of these requirements is discussed in the following paragraphs.

Precision

Precision is a measurement, expressed as a percentage, that represents the repeatability of the result by the analytical system. This measurement is based on the relative percent differences (RPDs) between laboratory duplicates and their respective parent analysis. The level of precision increases as the RPD value approaches 0%. The RPD is calculated using the following formula:

$$RPD = |PA-DU|/((PA+DU)/2))*100$$

where PA = respective parent analysis
DU = duplicate analysis

Similarly, RPD is calculated to evaluate the precision of Secondary Duplicate to Parent, Field Replicate to Parent, and Matrix Spike Duplicate to Matrix Spike.

As the analytical concentration approaches the detection limit for a given parameter, the confidence levels decreases. Thus, the RPD is generally only calculated for those analyses where both the parent and comparison sample analyses are greater than five times the detection limit.

Due to the chemical properties of radionuclides, the calculated RPD has a greater variance compared to that of non-radionuclides. To assist in evaluating the precision in radionuclides, the duplicate error ratio (DER) is also calculated. The level of precision increases as the DER value approaches 0%.

$$DER = |PA-DU|/(2\sigma p_a+2\sigma d_u)$$

where PA = Respective Parent Analysis
DU = Duplicate Analysis
$2\ \sigma p_a$ = Parent Analysis (2 sigma) Uncertainty
$2\ \sigma d_u$ = Duplicate Analysis (2 sigma) Uncertainty

The DQR goals for analytical data are presented in Appendix H, Table H-1. Analytical methods and precision goals are presented by analytical parameter and media for both soil and water.

RPD and DER values have been calculated for the matrix duplicate samples, secondary duplicate samples, field replicate samples, and matrix spike duplicate samples. A complete listing of RPD and DER values is presented in Appendix G, Table G-1. Summary tables for precision have been presented in Appendix H, Tables H-2 through H-5. Each table shows the number of samples completed, number of results greater than the detection limit, range and average for RPD and DER, and a comparison summary of results to the DQR goals. Most RPD and DER results meet the DQR goals for each parameter listed for each of the four types of quality samples listed above.

Accuracy

Accuracy is a statistical measurement, expressed as a percentage, which represents how close the analytical data are to the "true" values. The measurement is based on the percent recoveries (RECs) associated with the laboratory analytical matrix spikes. The level of accuracy increases as the amount of recovery approaches 100%. The REC is calculated using the following formula:

$$REC = (CONC_{ms}-CONC_{p})/SPIKED\ AMOUNT$$

where $CONC_{ms}$ = Concentration of Matrix Spike analysis

$CONC_{p}$ = Concentration of Parent analysis

Accuracy goals for analytical data are presented in Appendix H, Table H-1. Analytical methods and accuracy goals are presented by analytical parameter and media for both soil and water.

REC values have been calculated for MS samples. A summary table for accuracy is presented in Appendix H, Table H-6. The table shows the number of samples completed, number of results greater than the detection limit, range and average for REC, and a comparison summary of results to the DQR goals. Most REC values met the DQR goals for each parameter sampled.

Completeness

Completeness is the percentage of acceptable data points associated with a group of data, such as those validations requested or addressed in a semiannual validation report. An evaluation to determine the completeness of data will be conducted on WP-420 area data at the completion of all five RUs.

Data evaluation results from all quality control samples associated with RU8 activities indicated that most RPDs, DERs and RECs met the established DQR goals.

6.3 Data Validation

Radiological and chemical analytical data were subject to data review and validation upon receipt from the laboratory. Data validation was performed on 10% of all analytical data generated from the remedial activity at RU8. Additional data were validated by request after review by data review guidelines. Data validation was performed by WSSRAP personnel and was conducted in accordance with the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 5). Data that were used as preliminary data but later rejected due to failure to meet the data validation requirements were compared to the final data to ensure a valid final result was documented. Analytical data that were rejected for failure to comply with the data validation requirements are highlighted in the Analytical Data Table presented in Appendix D.

6.4 Data Management and Reduction

Data were reduced by entering and managing RU8 WSSRAP information in a computerized database. A data management process was developed to track samples collected and analyzed throughout the remedial process. Soil/Sediment Sampling Forms (field data sheets) were generated to record all pertinent sample collection information and associated QA/QC sample information. Sample information was transferred from the field data sheets into the computerized databases.

Data generated during remedial activities were entered into a field data tracking database (FST dB). The FST dB information was used to generate analytical request forms entered into an environmental sample tracking database (EST dB). The EST dB was used to print out sample Chain-Of-Custody Forms, which accompanied sample shipments to the laboratory. Preliminary analytical results were entered into a geographic information system database (GIS dB), which was later compared to the final analytical results entered into a wizard database (WIZARD). Databases were also used for analytical review and analytical results comparisons.

Data generated during RU8 remedial activities were evaluated through data verification, review, validation, and data management and reduction. Handling of all samples collected at RU8 was verified according to WSSRAP protocol. Data review activities ensured data generated from RU8 met DQRs and that all data validation discrepancies were resolved. A minimum of 10% of the data was subjected to data validation procedures, and results failing validation requirements were rejected or qualified. Data management and reduction actions computerized analytical results using a database system. Data evaluation activities indicated data generated at RU8 met DQOs specified in the *Project Management Contractor Quality Assurance Program* (Ref. 6), the *Environmental Quality Assurance Project Plan* (Ref. 7), and the *Chemical Plant Area Cleanup Attainment Confirmation Plan* (Ref. 5).

7. SUMMARY OF CLOSURE REPORT FINDINGS

7.1 Work Package Disposition

The total Work Package (WP)-420 area consists of 119 confirmation units (CUs) contained within five remedial units (RUs) (RU6, RU7, RU8, RU9, and RU10). This *RU8 Post Remedial Action Report* is the third of five such reports for the RUs and includes Confirmation Units 80 through 93. Detailed information regarding the remedial activities for each CU located within RU8 is presented in the Appendixes.

7.2 Confirmation Unit Dispositions

Upon completion of remedial activities, preliminary results were recorded on CU Disposition Forms. Disposition Forms were reviewed and signed by selected project personnel. Based on the preliminary results, each CU was released for unrestricted use. A CU was released when all contaminants of concern (COC) concentrations located within a CU were in compliance with cleanup standards. The cleanup standards ensure that RU8 remedial activities are conducted in compliance with the Record of Decision (ROD) (Ref. 3). Once final analytical data were received, the data were compared to preliminary analytical data to ensure COC concentrations were in compliance with the as low as reasonably achievable (ALARA) process.

All 14 CUs located within RU8 were unconditionally released. The boundaries of six CUs were revised and surveyed. Two CUs, CU78 and CU79, were deleted from this Work Package. A copy of the IOC documenting the elimination of CU78 and CU79 from WP-420 remedial activities is included in Appendix E.

7.3 Permanent Partial Confirmation Dispositions

A permanent partial confirmation disposition is the release of a portion of a CU area to facilitate the permanent closure of an area. The remainder of the CU, which was not included in the permanent partial confirmation disposition, is transferred to another Work Package order. There were no permanent partial confirmation dispositions associated with RU8.

Portions of CUs located on the western and southern boundaries of RU8 (i.e., areas located west or south of the access road), were eliminated from WP-420 remedial activities. An Inter-Office Correspondence (IOC) detailing the decision was issued. These remaining areas located in CU80, CU81, CU82, CU83, CU84, and CU87 will be addressed under a future Work Package at a later date. In addition, CU78 and CU79 were removed from the WP-420 Work Package and will be addressed under another Work Package at a later date.

7.4 Summary of Chemical Plant Area Remedial Unit 8 Results

The following table provides a summary of the total number of samples collected and analyzed for each contaminant during remedial activities at the chemical plant area RU8. The number of detections that exceed ALARA and minimum, maximum, and average concentrations are also provided for each contaminant. The table was generated using data sets compiled from all samples that represented soils left in place. Data from all other samples, including remediated hot spot areas, are presented in Appendix D.

TABLE 7-1 Summary Totals for Remedial Unit 8

CONTAMINANT	NUMBER OF SAMPLES	MINIMUM CONCENTRATION	MAXIMUM CONCENTRATION	AVERAGE CONCENTRATION	SAMPLES GREATER THAN ALARA
Arsenic (mg/kg)	15	4.7	34.1	10.07	0
Chromium (mg/kg)	15	12.4	22.3	16.52	0
Lead (mg/kg)	15	10.1	27.3	16.07	0
PCB (mg/kg)	20	0	5.8	0.58	5
Ra-226 (pCi/g)	22	1.28	1.67	1.48	0
Ra-228 (pCi/g)	22	0.63	1.75	1.24	0
Combined Radium	22	2.02	3.42	2.73	0
Th-230 (pCi/g)	32	0.89	5.65	1.46	1
Th-232 (pCi/g)	21	0.63	1.66	1.22	0
U-238 (pCi/g)	254	0.73	25.5	4.67	0
Total	434				6

Analytical results generated from remedial activities at RU8 indicate the average concentration of each COC over the entire RU8 area is below the ALARA goal. The RU8 average COC concentration for all COCs is below the ALARA goal.

For each of the 14 CUs located within RU8, COC averages were also calculated and the conclusions are as follows. Although some individual sample concentrations are above the ALARA goals, the average COC concentrations for each of the 14 CUs, except PCBs, are below ALARA. The average PCB concentration was above ALARA goal at one CU, CU86. Based on the ALARA committee decision, the CU was unconditionally released. The average PCB concentration for all 14 CUs is below the cleanup criteria. In addition, for the total number of PCB samples collected, 50 percent or more PCB concentrations were below the ALARA goal.

7.5 Summary of Chemical Plant Confirmation Results

To meet the requirements of the Record of Decision (Ref. 3), more than 50% of the results for each parameter must be less than the as low as reasonably achievable (ALARA) goal. Table 7-2 summarizes the cumulative results to date. This table includes results from WP-399, WP-420 (RU6/RU7/RU8) and VP9.

TABLE 7-2 Summary Totals for Confirmation

[a] CONTAMINANT	NUMBER OF SAMPLES	MINIMUM CONCENTRATION	MAXIMUM CONCENTRATION	AVERAGE CONCENTRATION	SAMPLES GREATER THAN ALARA
Arsenic (mg/kg)	706	0.97	34.10	7.37	0
Chromium (mg/kg)	697	5.00	41.60	16.71	0
Lead (mg/kg)	810	5.40	817	16.88	3
PAH (mg/kg)	121	ND	2.89	0.28	20
PCB (mg/kg)	884	ND	6.00	0.05	15
Ra-226 (pCi/g)	802	0.37	2.24	1.36	0
Ra-228 (pCi/g)	811	0.30	6.60	1.26	1
Combined Radium	811	0.96	8.84	2.61	2
Th-230 (pCi/g)	911	0.09	23.10	1.62	3
Th-232 (pCi/g)	811	0.30	6.60	1.26	1
Thallium (mg/kg)	165	0.12	2.20	0.61	0
TNT (mg/kg)	0	NA	NA	NA	NA
Toluene (mg/kg)	3	ND	3.40	1.13	0
U-238 (pCi/g)	1764	0.39	228.00	4.90	31

[a] This table contains summary results from confirmation sampling to date, including WP-399, WP-461, and WP-420 (RU6, RU7, and RU8).

7.6 Comparison of Standard Deviations

This section presents a comparison of the estimated standard deviations calculated following EPA guidance and presented in the Attainment Plan, (Ref. 5) with those deviations calculated using confirmation results. Since there were no existing remediation data available to calculate the standard deviation (sigma), the Attainment Plan estimated sigma using the range (assuming the average concentration remaining after remediation would not exceed cleanup criteria) divided by six. To determine whether the specified level of precision was obtained, a comparison was made between the estimated sigma and the calculated sigma using the RU8 results.

The comparison indicates that the specified level of precision (a false positive = 0.05 and a false negative = 0.20) has been obtained. All of the calculated sigmas are less than the estimated sigmas, indicating that the minimum specified precision was met in all RUs. Table 7-3 presents the estimated sigma and calculated sigmas for each contaminant of concern (COC).

The calculated sigmas for lead and Th-230 exceeded the estimated sigmas. Both of the contaminants had hot spot areas which used subsurface criteria, therefore, the estimated standard deviation was recalculated for lead and Th-230 using subsurface criteria. The recalculated estimated sigmas for lead and Th-230 are 750 and 2.7, respectively. Both calculated sigmas are less than the subsurface estimated sigmas. Also note, although the RU8 sigma for PCBs is just above the estimated sigma, the cumulative sigma is still below.

TABLE 7-3 Comparison of Standard Deviations

COC	ESTIMATED SIGMA [a]	RU8 SIGMA [b]	CUMULATIVE SIGMA [c]
Arsenic	12.5	7.34	3.46
Chromium	18.3	2.64	4.90
Lead	75	5.01	184.53
PAHs	0.93	NA	0.59
PCBs	1.33	1.35	0.33
TNT	23.3	NA	NA
Ra-226	1.03	0.12	0.20
Ra-228	1.03	0.34	0.35
Thallium	3.3	NA	0.51
Th-230	1.03	0.91	1.09
Th-232	1.03	NA	NA
U-238	20	4.70	12.49

(a) Sigma estimated in the *Attainment Plan* (Ref. 5).

(b) Sigma calculated using only the WP420-RU8 confirmation results.

(c) Sigma calculated using cumulative confirmation results (WP-399, WP-461, WP420RU6, WP420RU7, and WP420RU8).

8. REFERENCES

1. MK-Ferguson Company and Jacobs Engineering Group. *Remedial Investigation for the Chemical Plant Area of the Weldon Spring Site*, Rev. 0, 2 Vols. DOE/OR/21548-074. Prepared for the U.S. Department of Energy, Oak Ridge Field Office, Weldon Spring Site Remedial Action Project. St. Charles, MO. November 1992.

2. MK-Ferguson Company and Jacobs Engineering Group. *Supplementary Soil Sampling Plan*, Rev. 0. DOE/OR/21548-408. Prepared for the U.S. Department of Energy, Oak Ridge Field Office. St. Charles, MO. August 1993.

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5. MK-Ferguson Company and Jacobs Engineering Group. *Chemical Plant Area Cleanup Attainment Confirmation Plan*. Rev. 3. DOE/OR/21548-491. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. December 1995.

6. MK-Ferguson Company and Jacobs Engineering Group. *Project Management Contractor Quality Assurance Program*, Rev. 2, DOE/OR/21548-333. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. December 1995.

7. MK-Ferguson Company and Jacobs Engineering Group. *Environmental Quality Assurance Project Plan*. Rev. 2. DOE/OR/21548-352. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. May 1996.

8. Department of Energy. *Chemical Plant Area Foundations and Contaminated Soil Removal - WP-420*. June 5, 1995

9. Oak Ridge Institute for Science and Education. *Final Verification Survey Plan for the Chemical Plant Area Weldon Spring Site Remedial Action Project, Weldon Spring, Missouri*. Prepared by the Environmental Survey and Site Assessment Program, Energy/Environment Systems Division, for the U.S. Department of Energy. Weldon Spring, Missouri. December 7, 1995.

10. MK-Ferguson Company and Jacobs Engineering Group. *Surface Water Management Plan*, Rev. 2. DOE/OR/21548-221. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. July 1996.'

8.1 Procedures

ES&H 1.1.4 *Logbook Procedure*
ES&H 1.2.1 *Soil Remediation Disposition Process*

ES&H 2.3.8 *Contamination Survey*

ES&H 2.4.1 *Calibration and Use of Portable Radiological Survey Instruments*

ES&H 2.5.1 *Radiological Soil Sampling*

ES&H 2.5.2 *In Situ Radiation Measurements*

ES&H 2.5.5 *Sample Preparation Procedure for Radiological Soil Samples*

ES&H 2.5.8 *Th-230 Determinations in Soils by the UNC Method*

ES&H 2.6.9 *Instructions for Calibration and Operation of the High Purity* Germanium Detector

ES&H 4.1.3 *Sample Equipment Decontamination*

ES&H 4.1.4 *QC Samples for Aqueous and Solid Matrices*

ES&H 4.4.1 *Numbering System for Environmental Samples*

ES&H 4.4.5 *Soil/Sediment Sampling*
ES&H 4.9.1 *Environmental Monitoring Data Verification*
ES&H 4.9.2 *Environmental Monitoring Data Validation*

8.2 Instructions

ES&H 150 *Use of Ludlum Model (44-10 [2x2] and 44-2 [1x1]) NaI Detector*
ES&H 203 *Use of On-Site Radiological Laboratory*

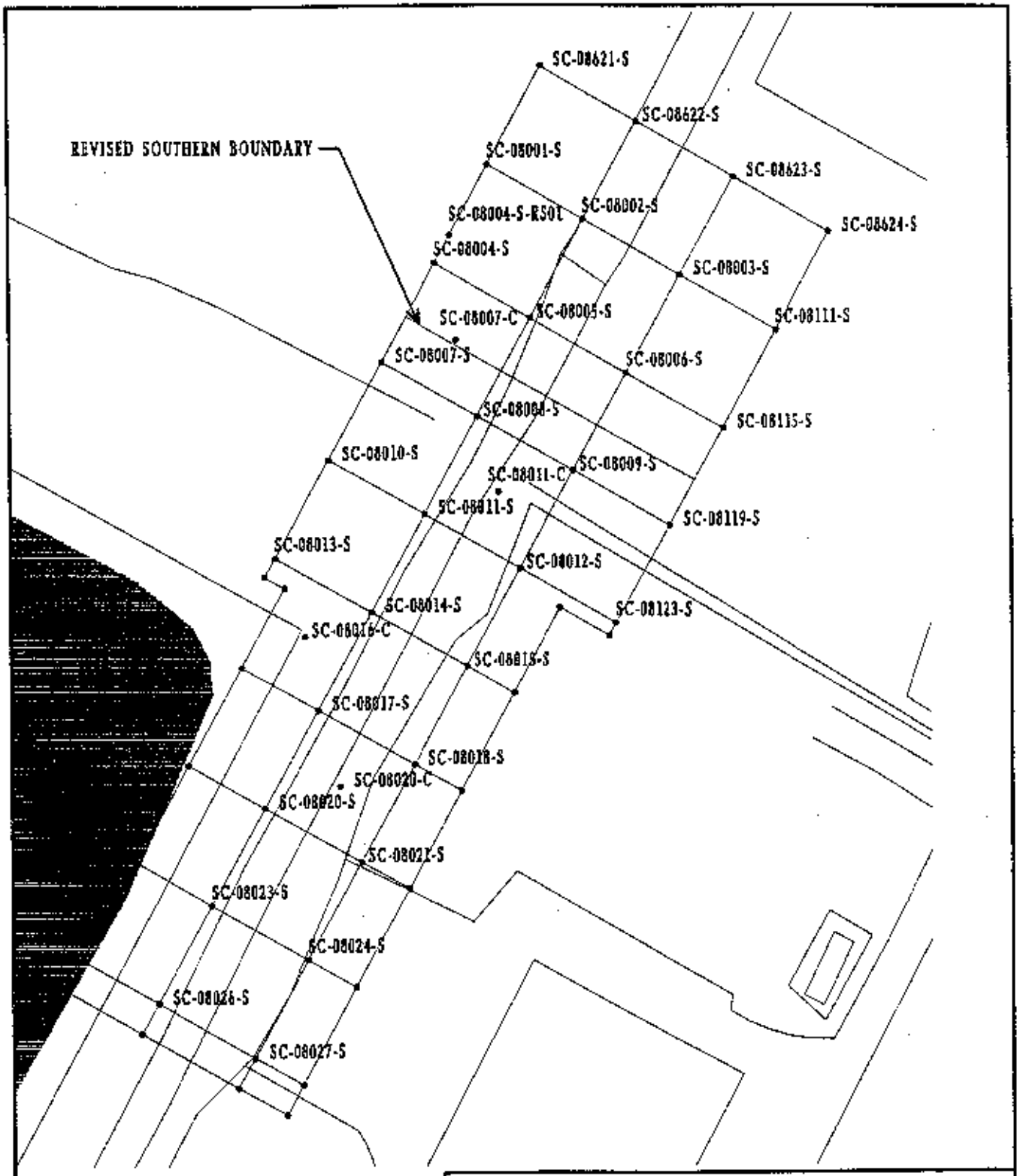
8.3 Acronyms

AEC	Atomic Energy Commission
ALARA	as low as reasonably achievable
COC	contaminant of concern
CPM	counts per minute
CU	Confirmation Unit
dB	database

DER	duplicate error ratio
DNT	dinitrotoluene
DOE	Department of Energy
DQO	Data Quality Objectives
DQR	Data Quality Requirements
EPA	Environmental Protection Agency
EQAPjP	Environmental Quality Assurance Project Plan
ES&H	Environmental Safety and Health
EST	environmental sample tracking
FST	field sample tracking
GIS	Geographical Information System
ha	hectare
IOC	interoffice correspondence
km	kilometers
m	meter
NPL	National Priorities List
PAHs	polynuclear aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PMC	Project Management Contractor
QA	quality assurance
QAP	Quality Assurance Plan
QC	quality control
Ra-226	Radium-226
Ra-228	Radium-228
REC	percent recovery
ROD	Record of Decision
RPD	relative percent difference
RU	remedial unit
SOP	standard operating procedure
Th-230	Thorium-230
Th-232	Thorium-232
TNT	trinitrotoluene
U-238	Uranium-238
WIZARD	Wizard database
WP	work package
WSSRAP	Weldon Spring Site Remedial Action Project

APPENDIX A

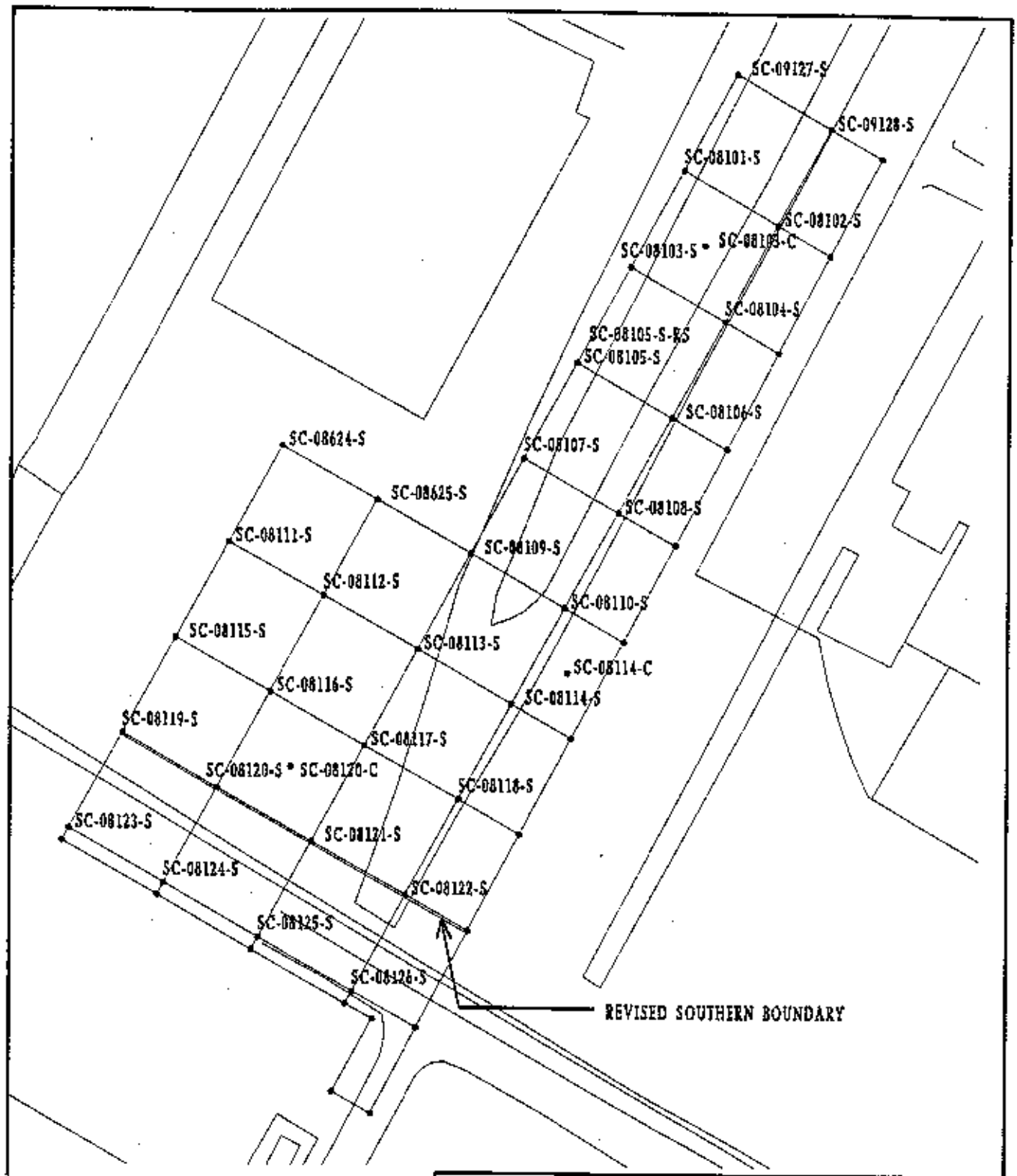
Sample Location Maps



Sample Locations in Remedial Unit RU008 Confirmation Unit CU080

Figure A-1

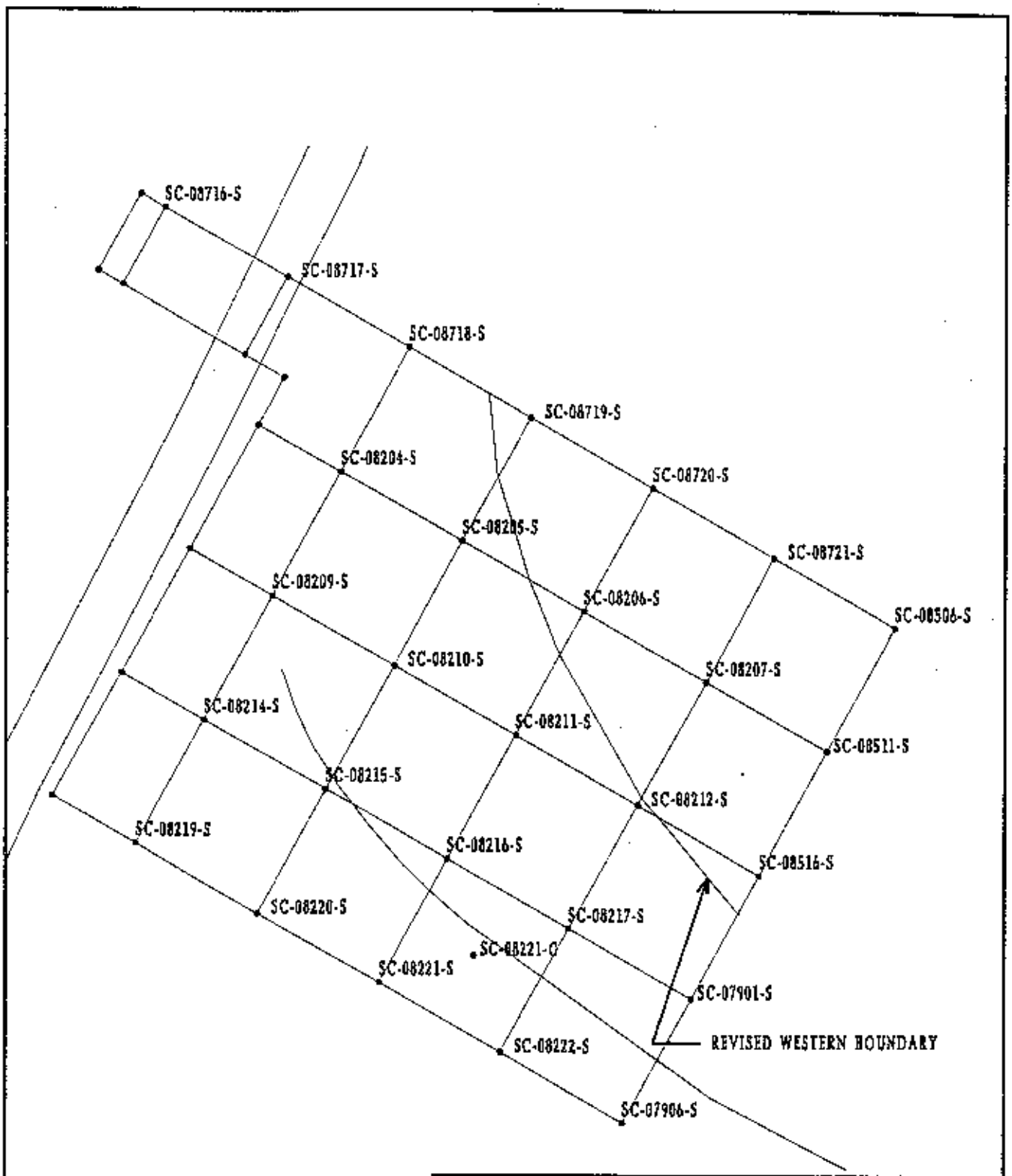
EXHIBIT NO.: G/CP/343/0997		REPORT NO.: DOE/OR/21548-684	
ORIGINATOR: MGL	DRAWN BY: LGB	DATE: 11/03/97	



Sample Locations in Remedial Unit RU008 Confirmation Unit CU081

Figure A-2

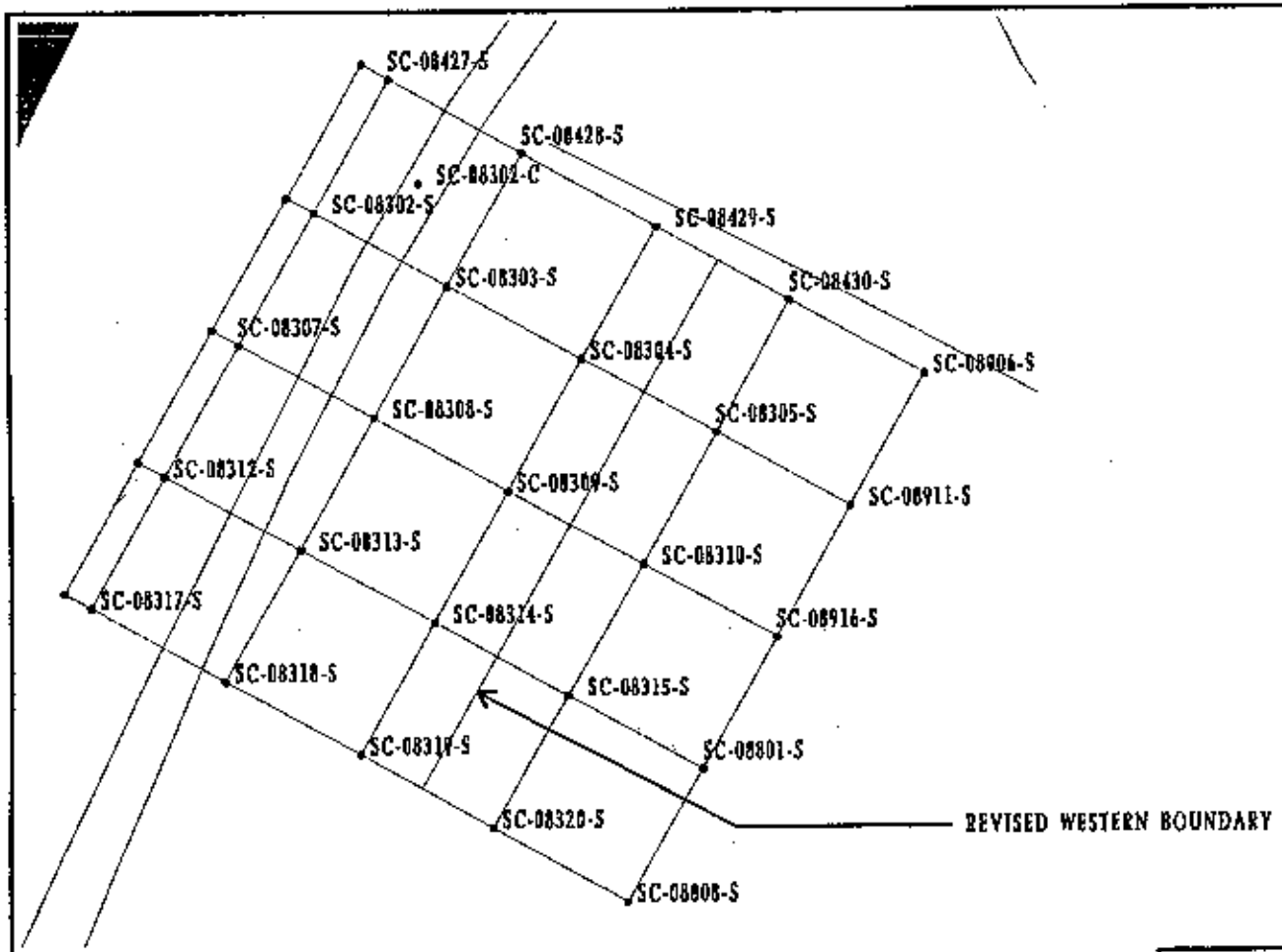
EXHIBIT NO.: G/CP/344/0997		REPORT NO.: DOE/OR/21548-684	
ORIGINATOR: MGL	DRAWN BY: LGB	DATE: 11/03/97	



Sample Locations in Remedial Unit RU008
Confirmation Unit CU082

Figure A-3

EXHIBIT NO.: G/CP/345/0997	REPORT NO.: DOE/OR/21548-684	
ORIGINATOR: MGL	DRAWN BY: LGB	DATE: 11/03/97



10 5 0 METERS

30 15 0 FEET

N
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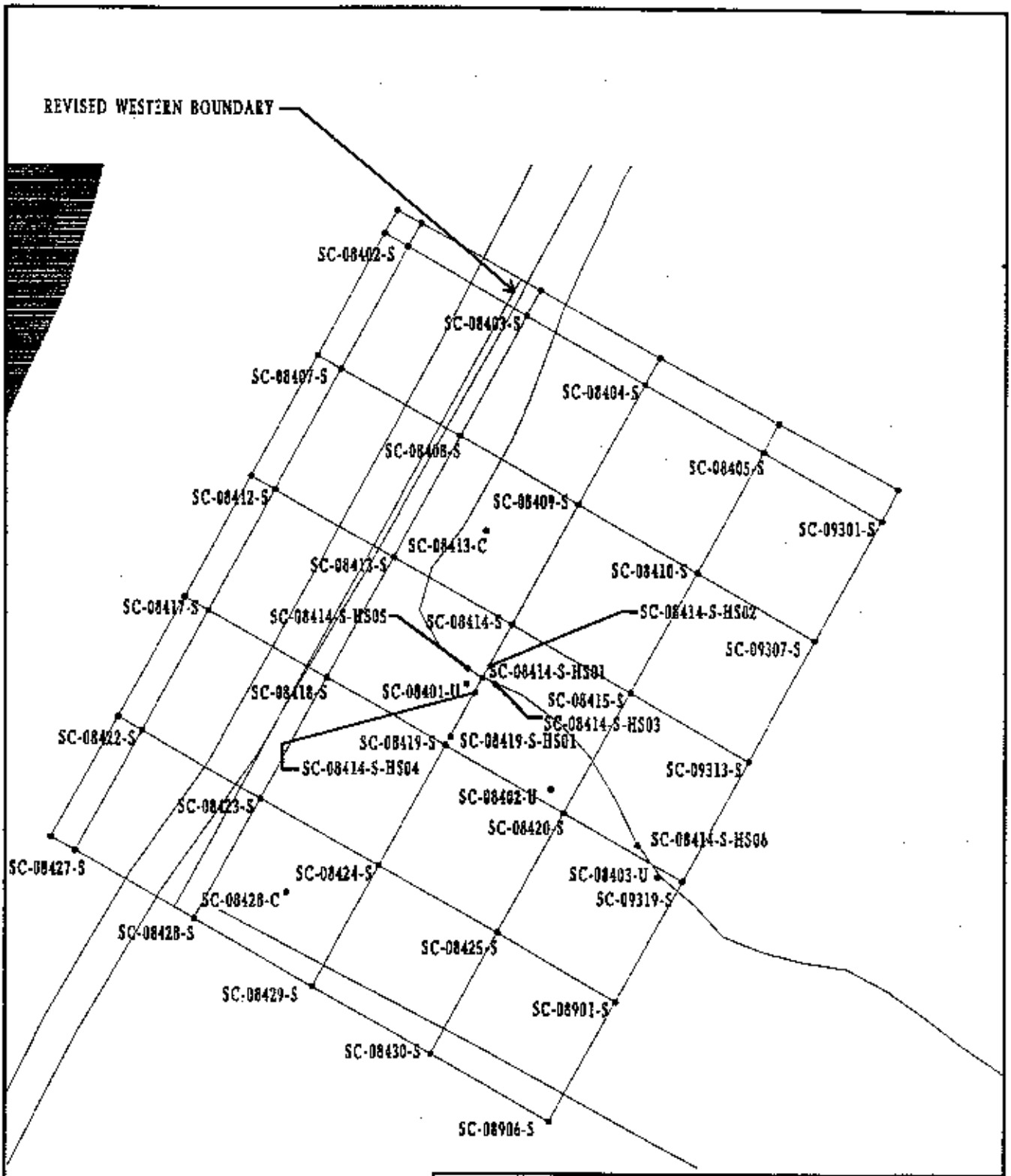
Sample Locations in Remedial Unit RU008 Confirmation Unit CU083

Figure A-4

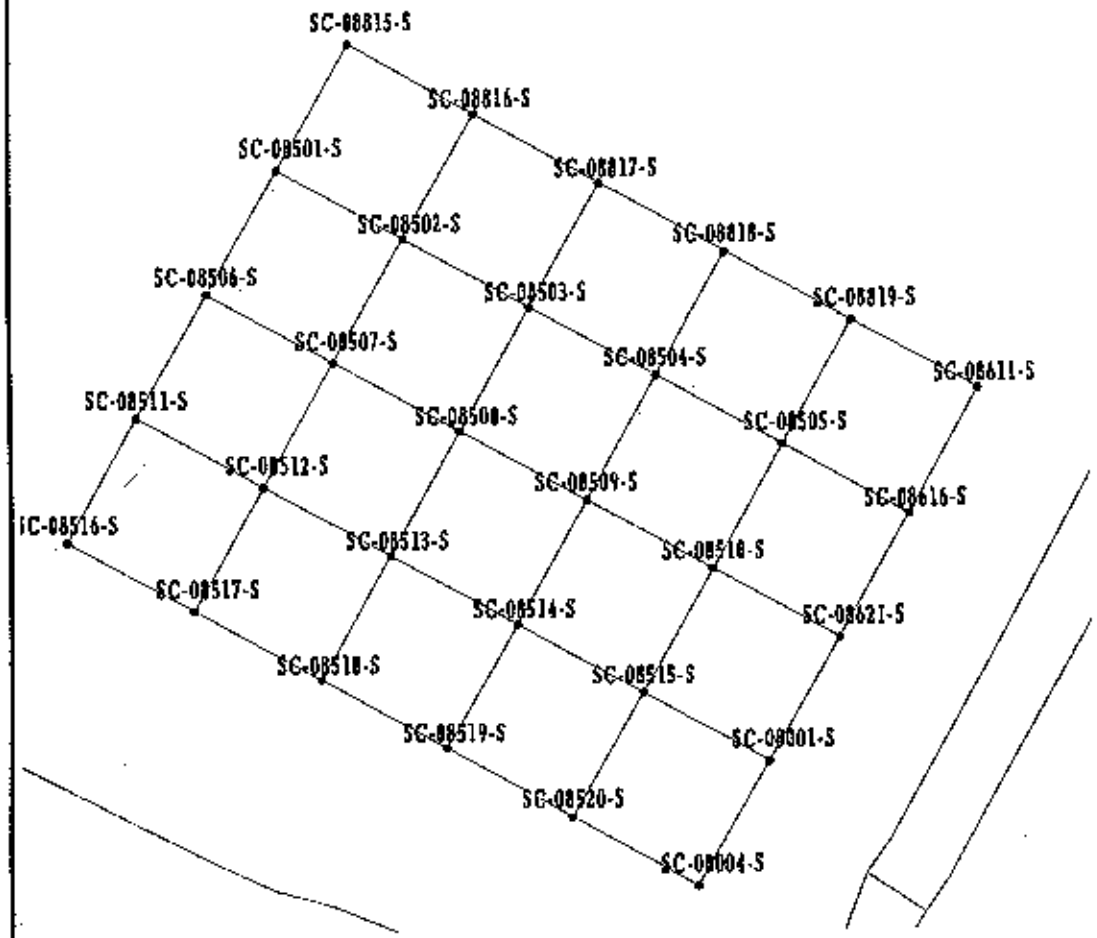
EXHIBIT NO.: G/CP/346/0997			REPORT NO.: DOE/OR/21548-684		
ORIGINATOR: MGL	DRAWN BY: LGB	DATE: 11/03/97			



Sample Locations in Remedial Unit RU008
Confirmation Unit CU084

Figure A-5

EXHIBIT NO.:	G/CP/345/0997	REPORT NO.:	DOE/OR/21548-684		
ORIGINATOR:	MGL	DRAWN BY:	LGB	DATE:	11/03/97



10 5 0 METERS

30 15 0 FEET

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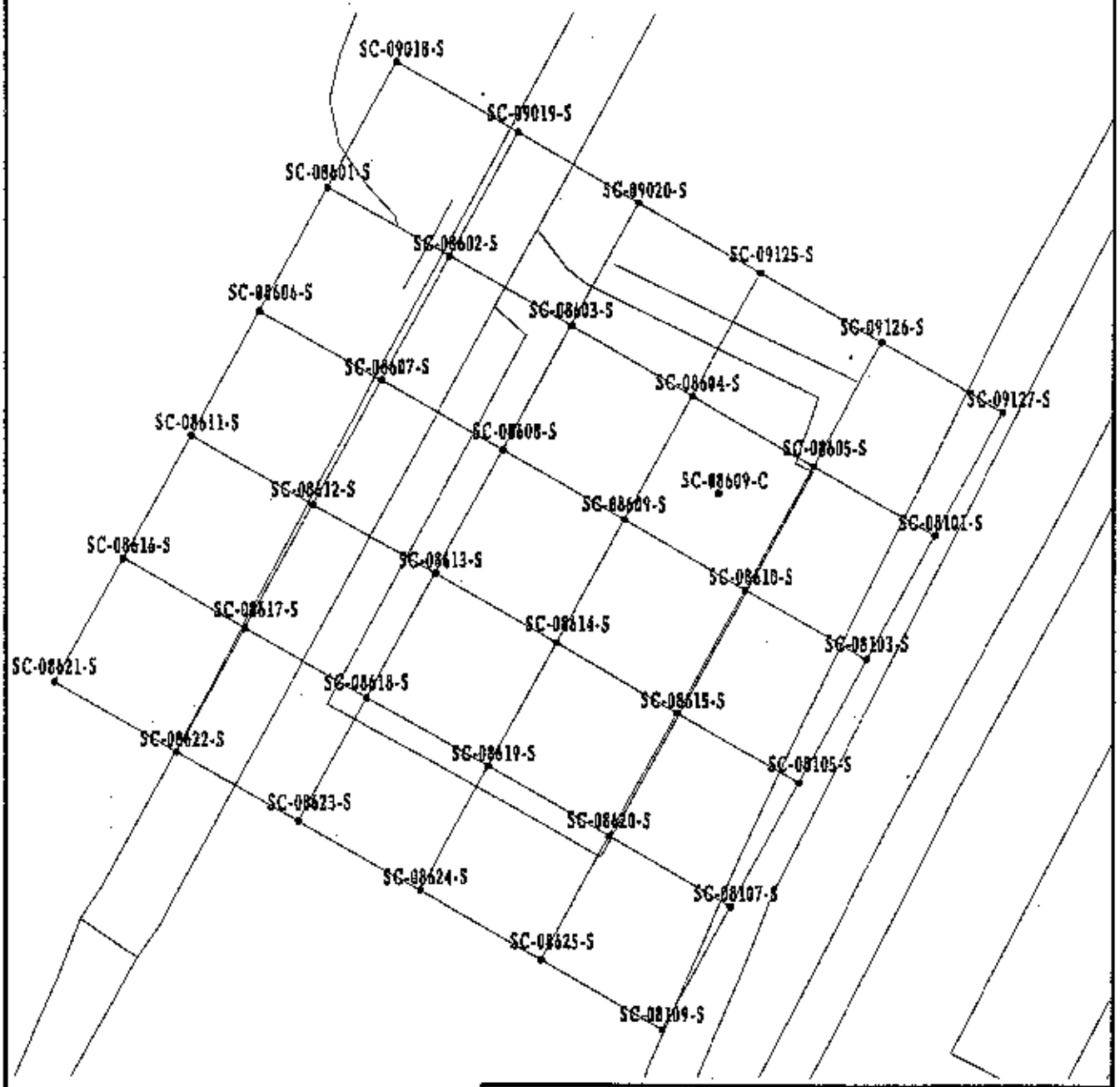
Sample Locations in Remedial Unit RU008 Confirmation Unit CU085

Figure A-6

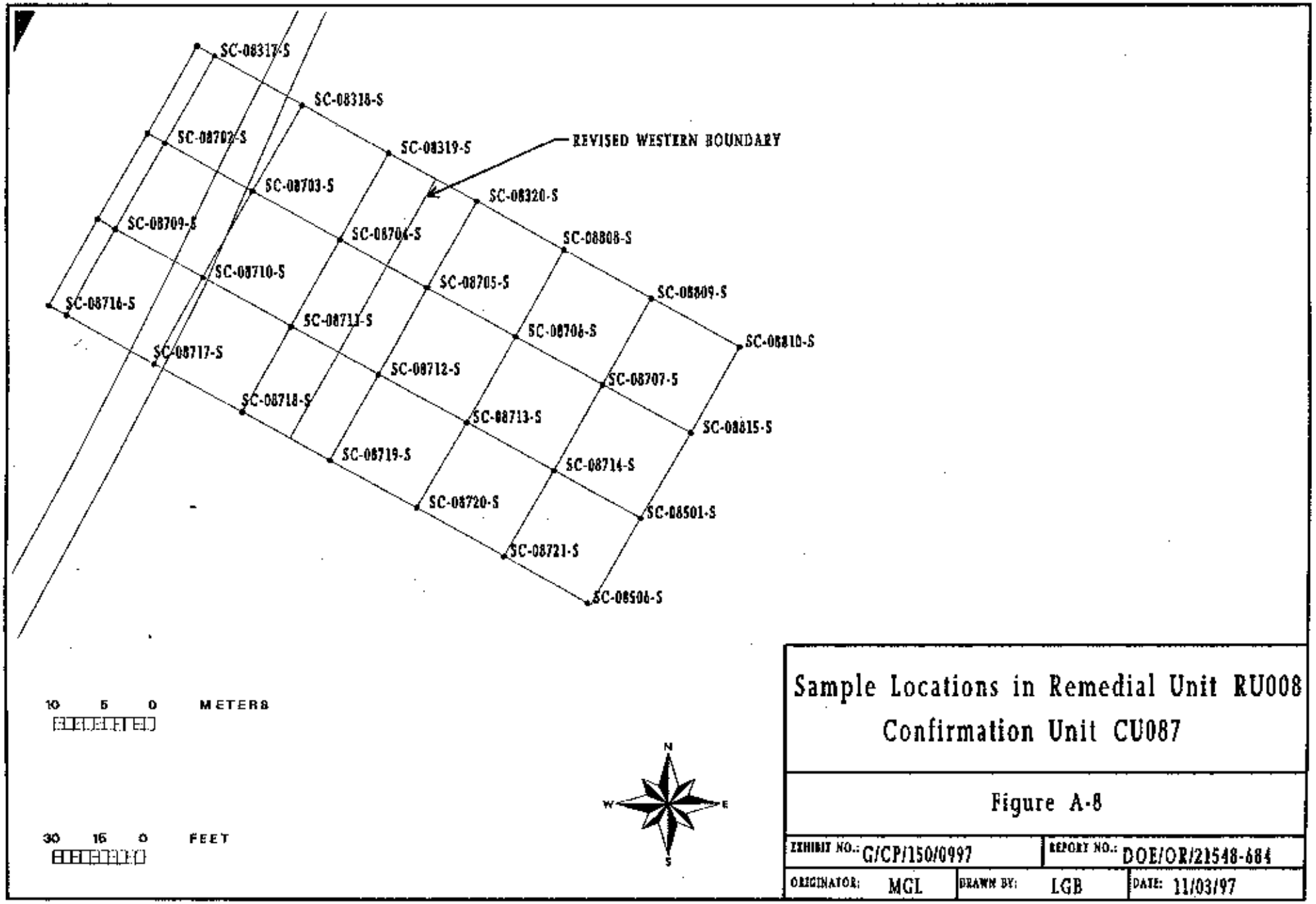
EXHIBIT NO.:	G/CP/148/0997	REPORT NO.:	DOE/OR/21548-684		
ORIGINATOR:	MGL	DRAWN BY:	LGB	DATE:	11/03/97



Sample Locations in Remedial Unit RU008 Confirmation Unit CU086

Figure A-7

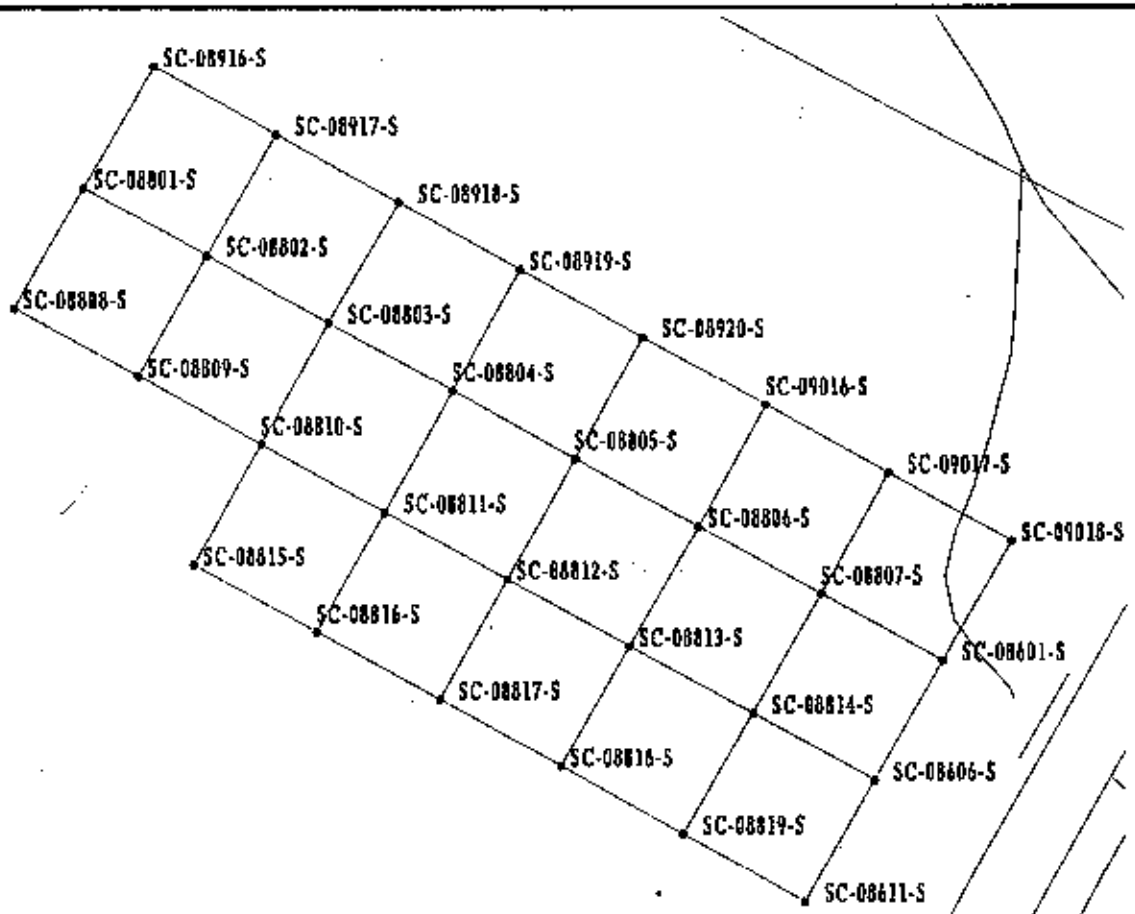
EXHIBIT NO.: G/CP/149/0997	REPORT NO.: DOE/OR/21548-684	
ORIGINATOR: MGL	DRAWN BY: LGB	DATE: 11/03/97



Sample Locations in Remedial Unit RU008 Confirmation Unit CU087

Figure A-8

EXHIBIT NO.: G/CP/150/0997		REPORT NO.: DOE/OR/21548-684	
ORIGINATOR: MGL	DRAWN BY: LGB	DATE: 11/03/97	



10 6 0 METERS

30 15 0 FEET

N
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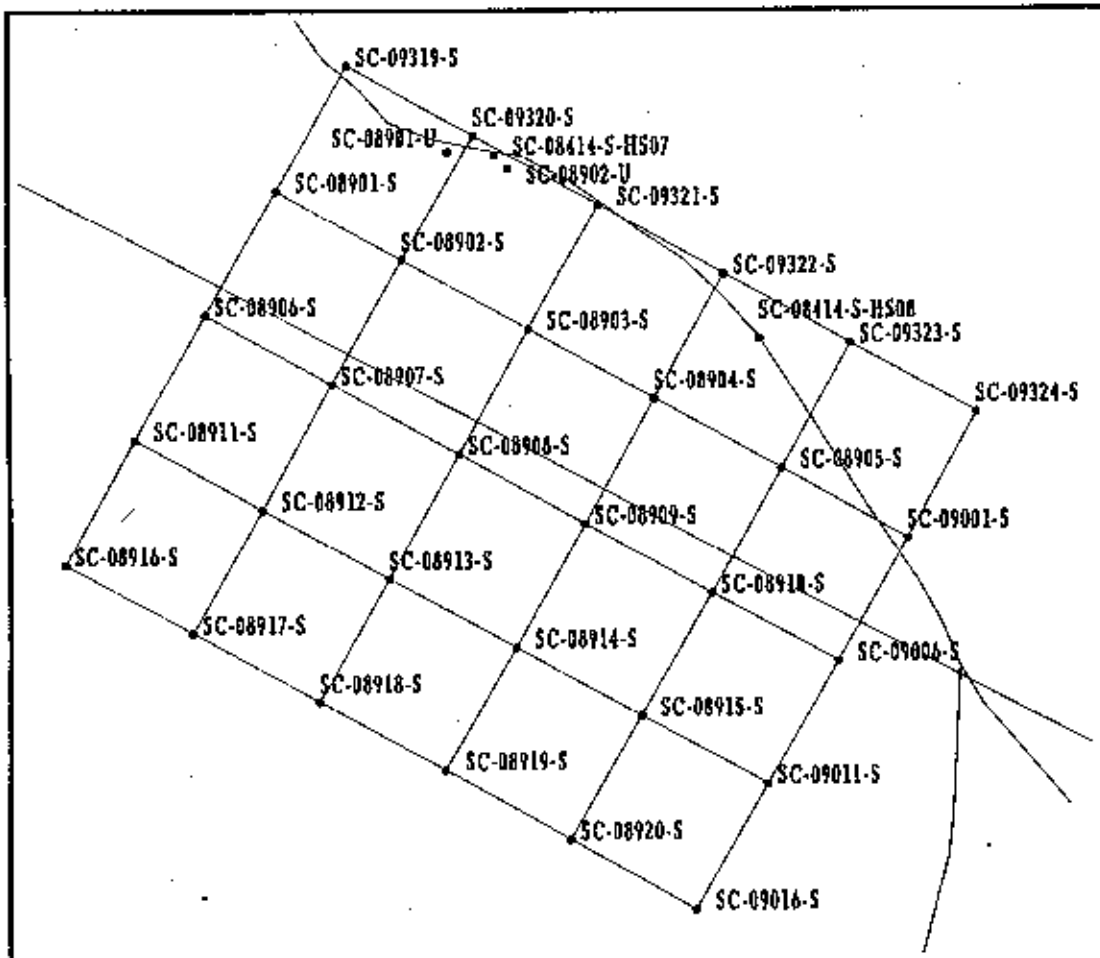
Sample Locations in Remedial Unit RU008 Confirmation Unit CU088

Figure A-9

EXHIBIT NO.:	G/CP/151/0997	REPORT NO.:	DOE/OR/21548-684		
ORIGINATOR:	MGL	DRAWN BY:	LGB	DATE:	11/03/97



10 5 0 METERS

30 15 0 FEET

N

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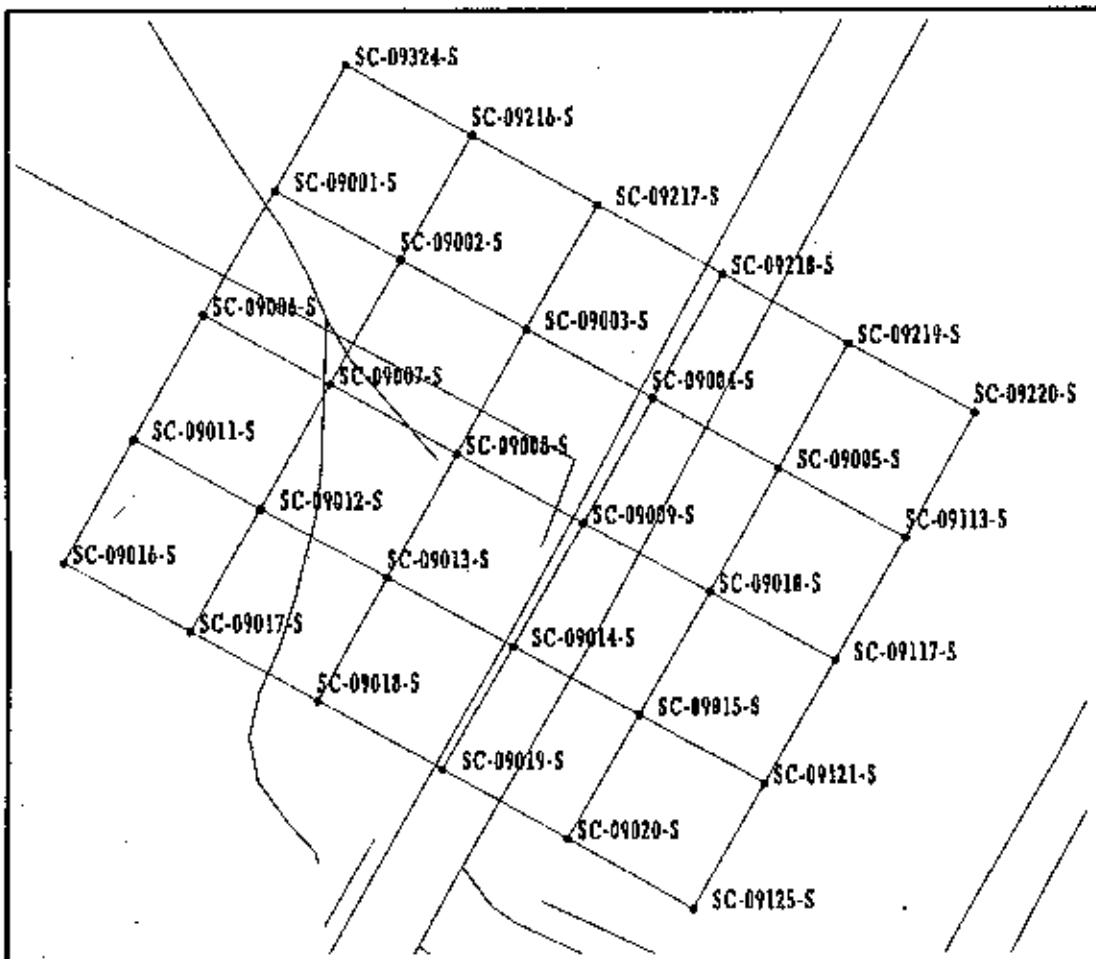
Sample Locations in Remedial Unit RU008 Confirmation Unit CU089

Figure A-10

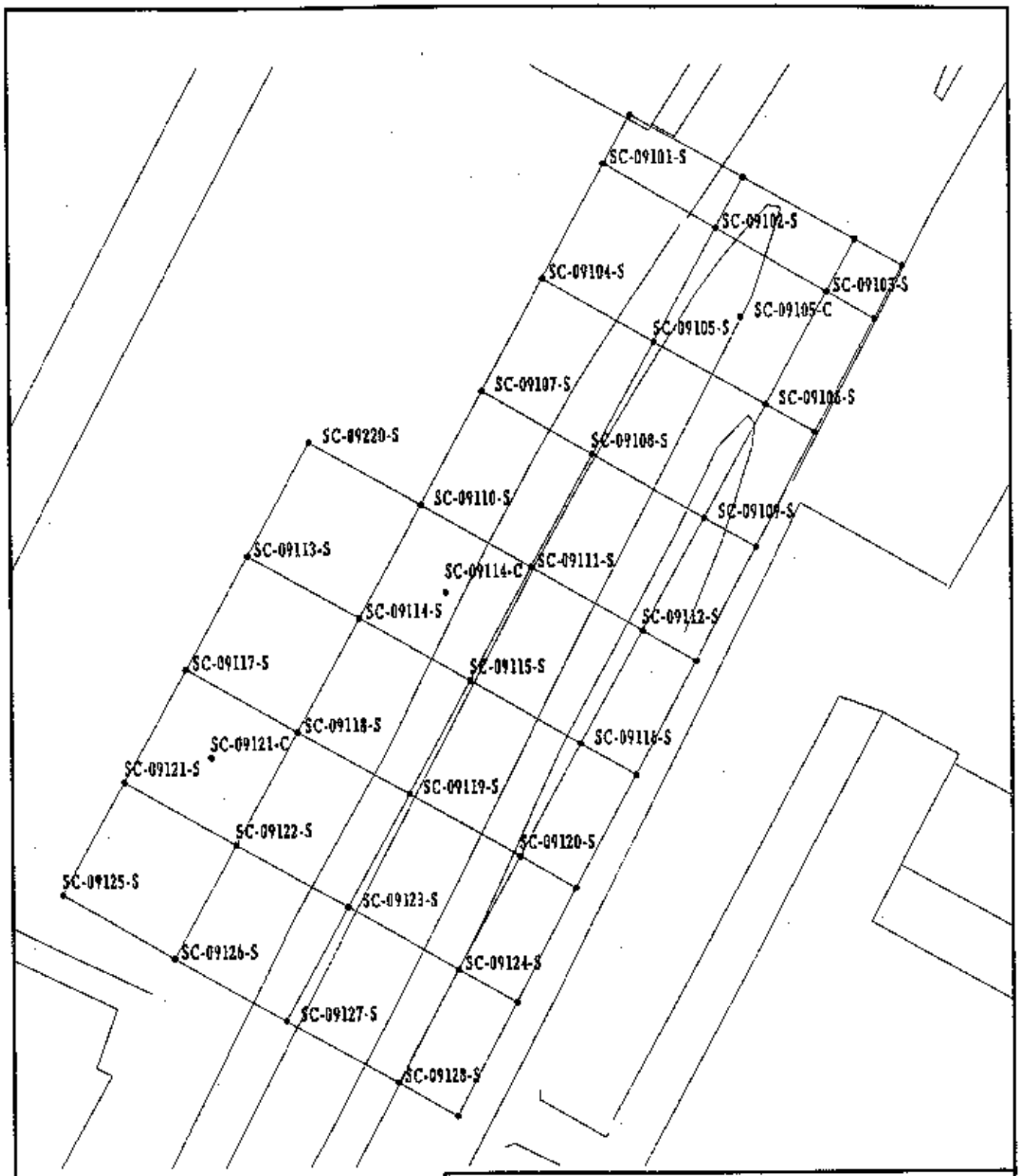
EXHIBIT NO.: G/CP/346/0997			REPORT NO.: DOE/OR/21548-684		
ORIGINATOR: MGL	DRAWN BY: LGB	DATE: 11/03/97			



Sample Locations in Remedial Unit RU008 Confirmation Unit CU090

Figure A-11

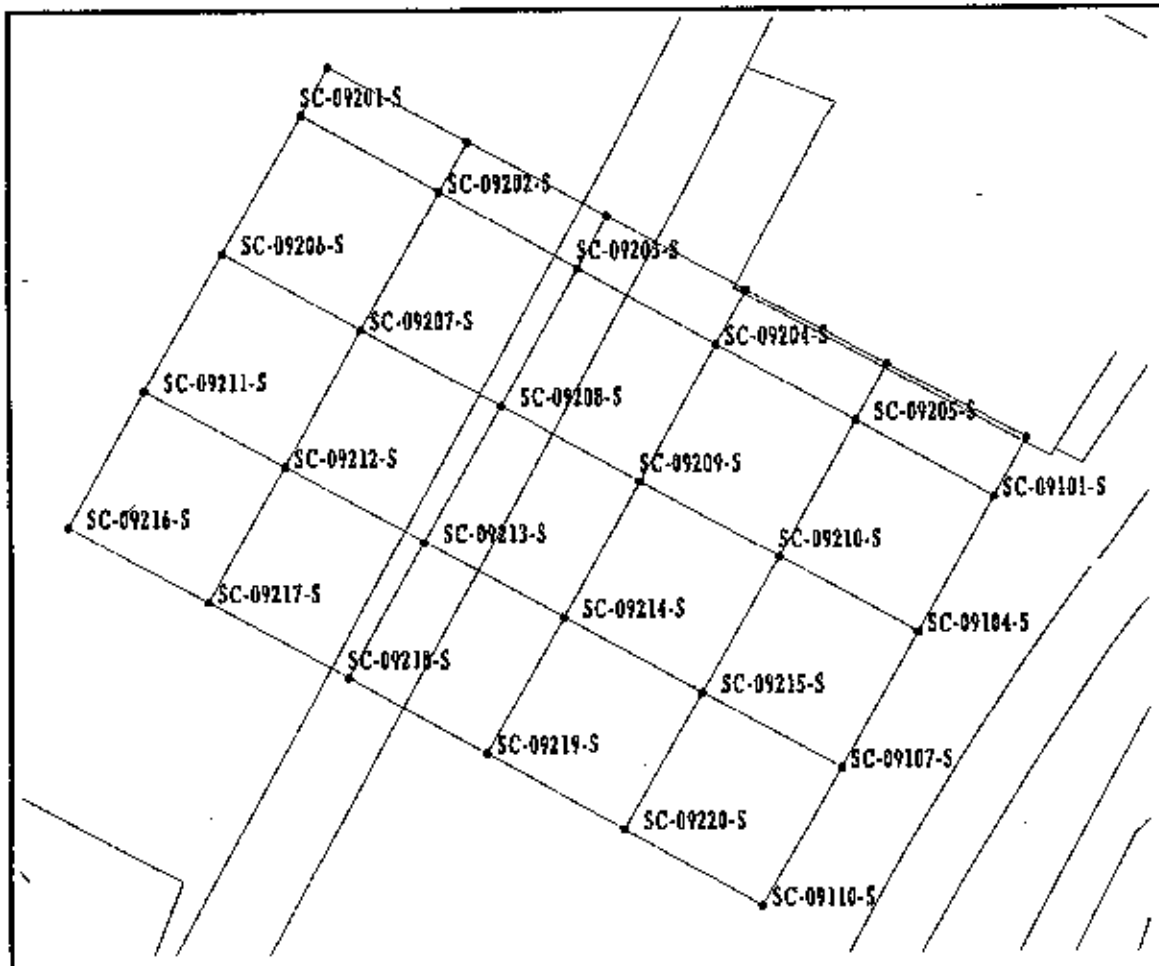
EXHIBIT NO.: G/CP/153/0997		REPORT NO.: DOE/OR/21548-684	
ORIGINATOR: MGL	DRAWN BY: LGB	DATE: 11/03/97	



Sample Locations in Remedial Unit RU008 Confirmation Unit CU091

Figure A-12

EXHIBIT NO.: G/CP/154/0997	REPORT NO.: DOE/OR/21548-684	
ORIGINATOR: MGL	DRAWN BY: LGB	DATE: 11/03/97



10 5 0 METERS

30 15 0 FEET

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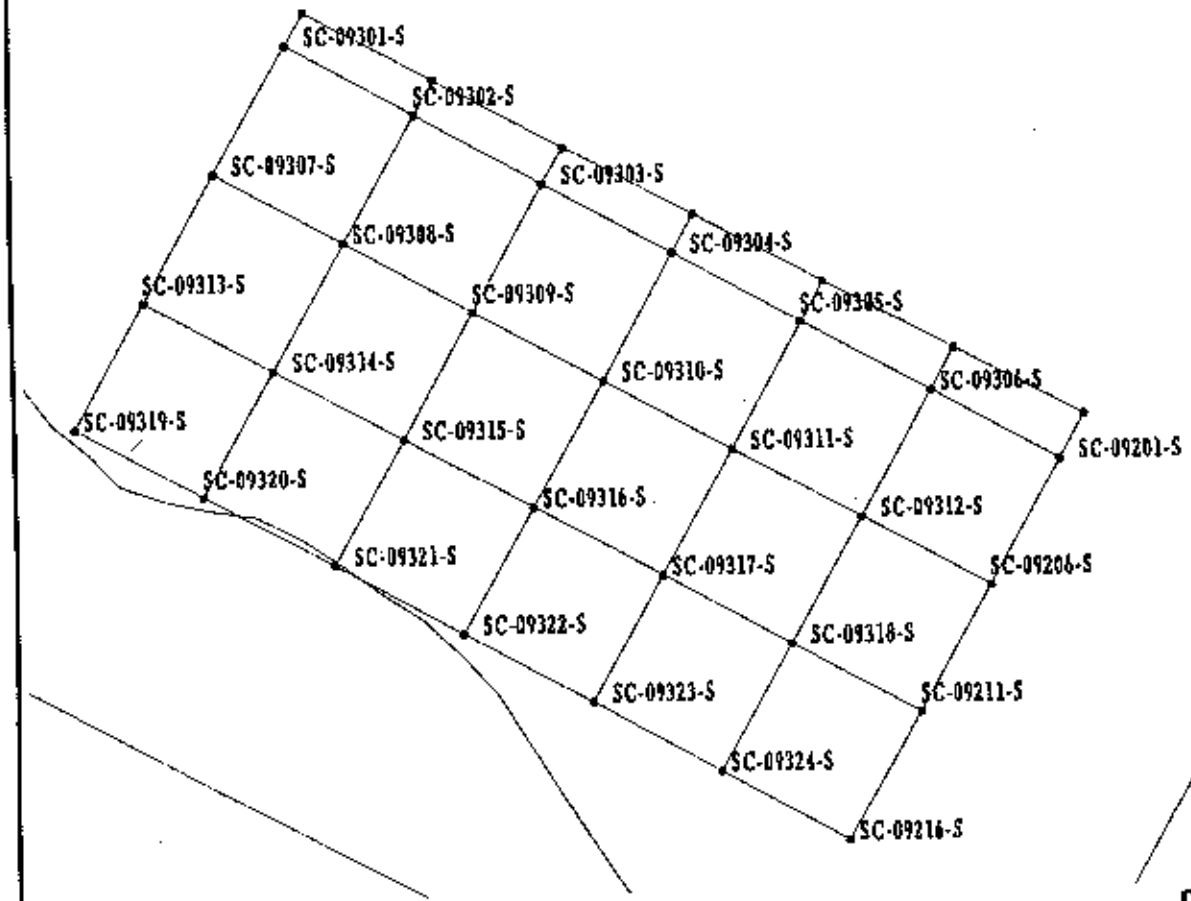
Sample Locations in Remedial Unit RU008 Confirmation Unit CU092

Figure A-13

EXHIBIT NO.: G/CP/155/0997			REPORT NO.: DOE/OR/21548-684		
ORIGINATOR: MGL	DRAWN BY: LGB	DATE: 11/03/97			



10 5 0 METERS

30 15 0 FEET

N E S

Sample Locations in Remedial Unit RU008 Confirmation Unit CU093

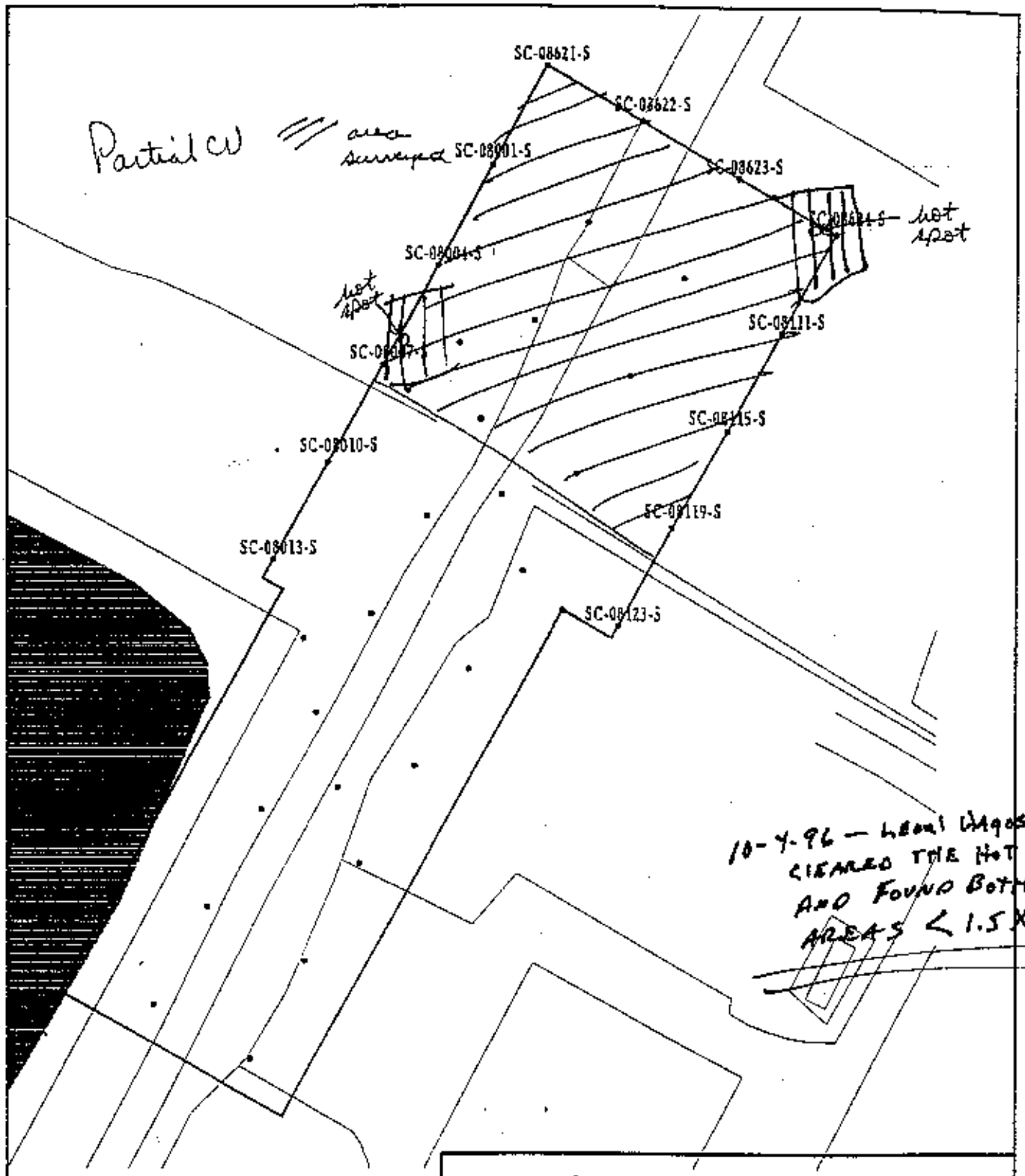
Figure A-14

EXHIBIT NO.:	G/CP/156/0997	REPORT NO.:	DOE/OR/21548-684		
ORIGINATOR:	MGL	DRAWN BY:	LGB	DATE:	11/03/97

APPENDIX B

Radiation Survey Forms WP-420

Radiation Survey Form WP 420, RU008CU080

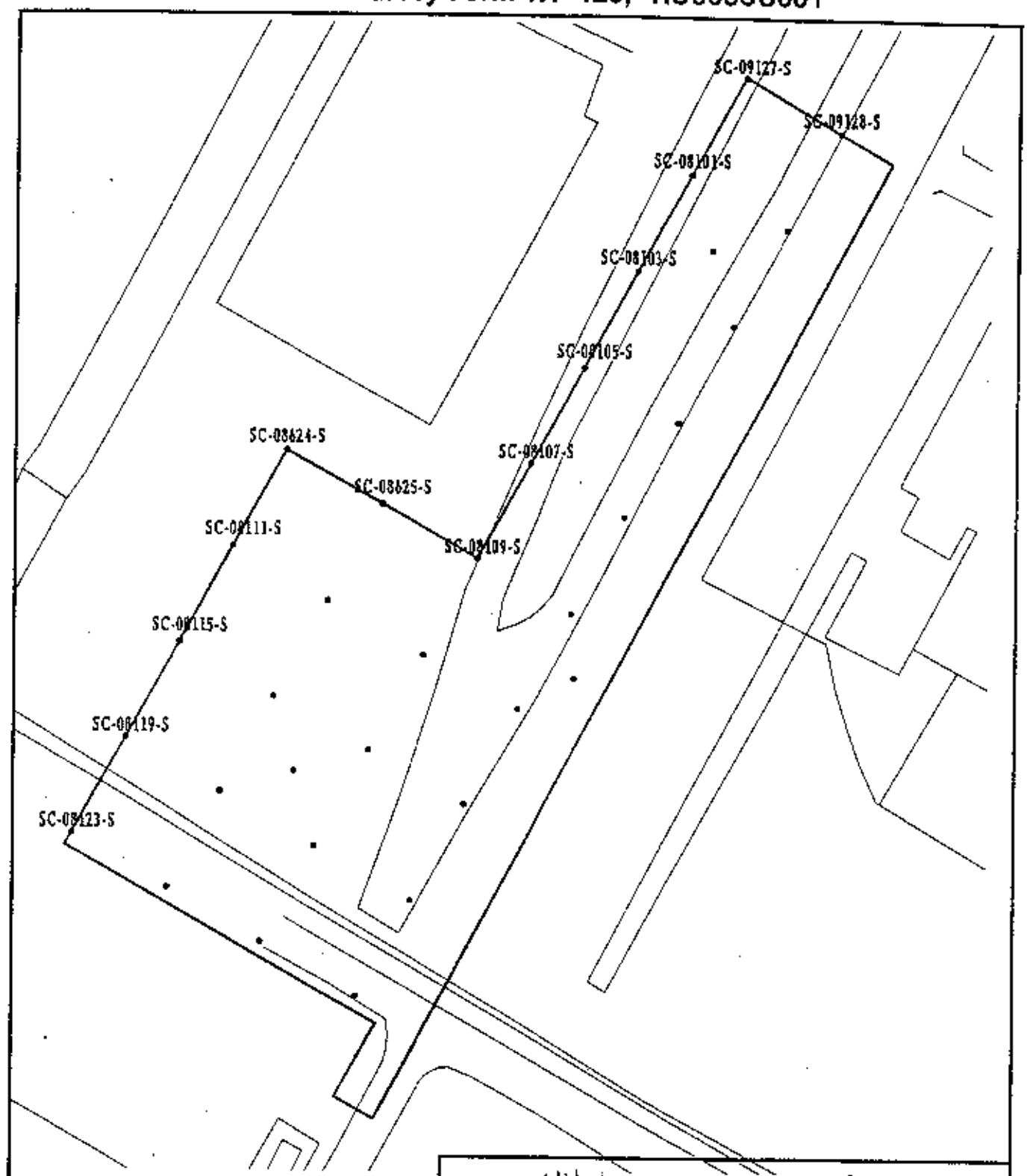


Meter Model#: 2210
Meter Serial#: 106674 106701
Calibration Due: 12/4/96 9/1/97
Survey Date/Time: 10/1/96 2200
Surveyor(s): J. Geyer, B. McClave

Detector Model#: 44-10
Detector Serial#: E 42340 D 83544
Calibration Due: E 6/12/97 D 7/11/97
Field Bkg.: 10000

Comments: area surveyed w/shielded detectors; all areas less than 1.5x Bkg except 2 hotspots noted on map

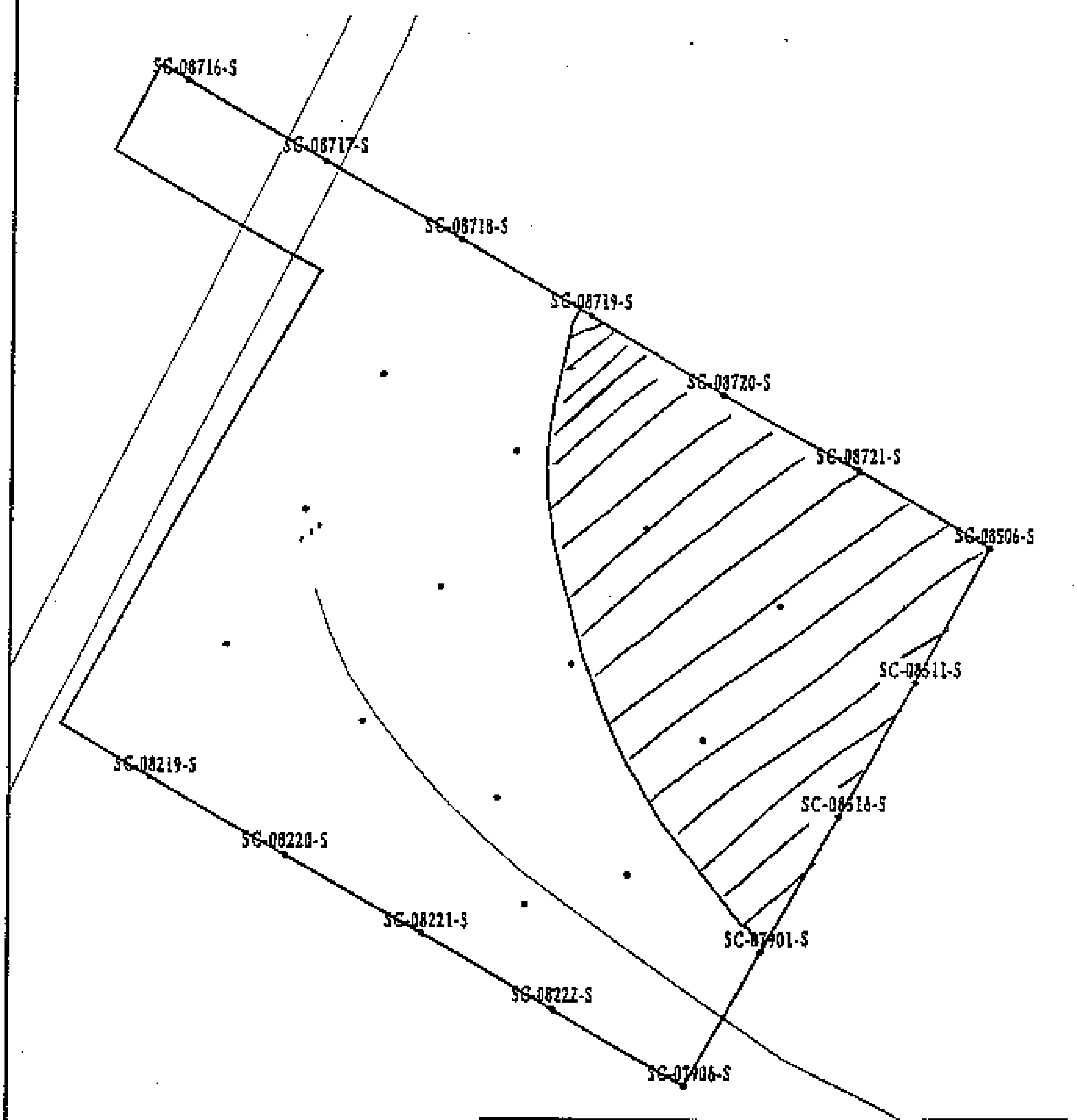
Radiation Survey Form WP 420, RU008CU081

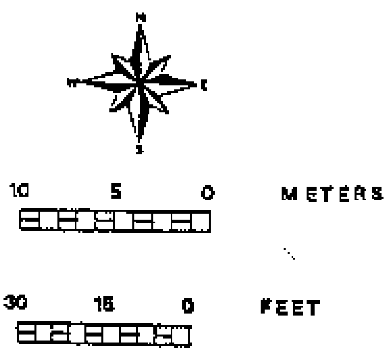


Meter Model#: 44-10
Meter Serial#: 127252, 104701
Calibration Due: 3-4-97, 2-7-97
Survey Date/Time: 10-3-96 0900-1300
Surveyor(s): T. Butzlaff / L. Hagoss
Comments: The above area was surveyed and found to be less than 1.5 times background.

Detector Model#: 2x2 NaI
Detector Serial#: 122408-I 035449-D
Calibration Due: 4-3-97, 7-1-97
Field Bkg.: 12,000 / 9,400 cpm

Radiation Survey Form WP 420, RU008CU082





Meter Model#: 44-10

Detector Model#: 2x2 NaI

Meter Serial#: 122252, 125433

Detector Serial#: 122608-I (Shielded) 9246-F (Shielded)

Calibration Due: 3-6-97, 2-7-97

Calibration Due: 4-2-97, 6-12-97

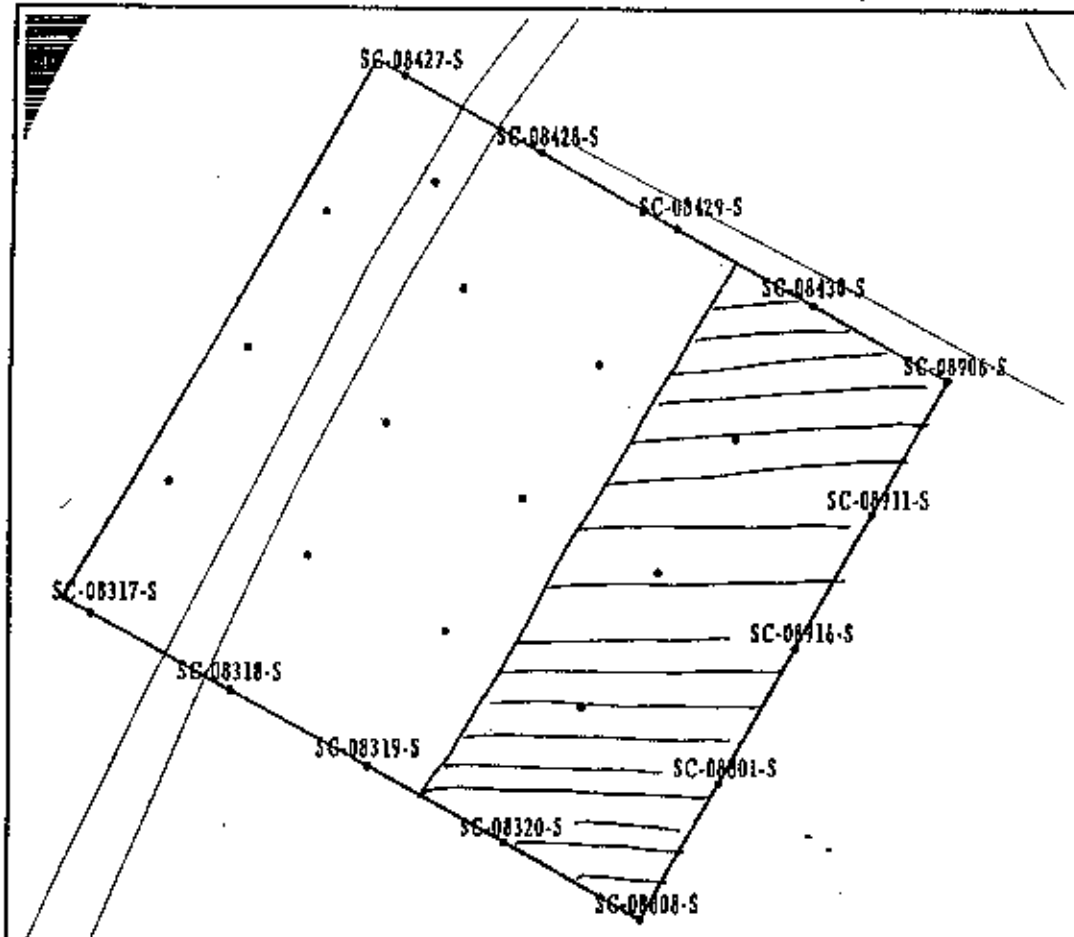
Survey Date/Time: 9-11-96 0900-1000

Field Bkg.: 5,800 / 6,000 cpm

Surveyor(s): T. Butzlaff / L. Hagoss

Comments: The above marked area was surveyed and was found to be less than 1.5 times background.

Radiation Survey Form WP 420, RU008CU083



10 5 0 10 METERS

30 15 0 30 FEET

N E S

Meter Model#: 44-10 Detector Model#: 2x2 NaI 122(608-I (Shielded)

Meter Serial#: 127252, 125433 Detector Serial#: 4240-F (Shielded)

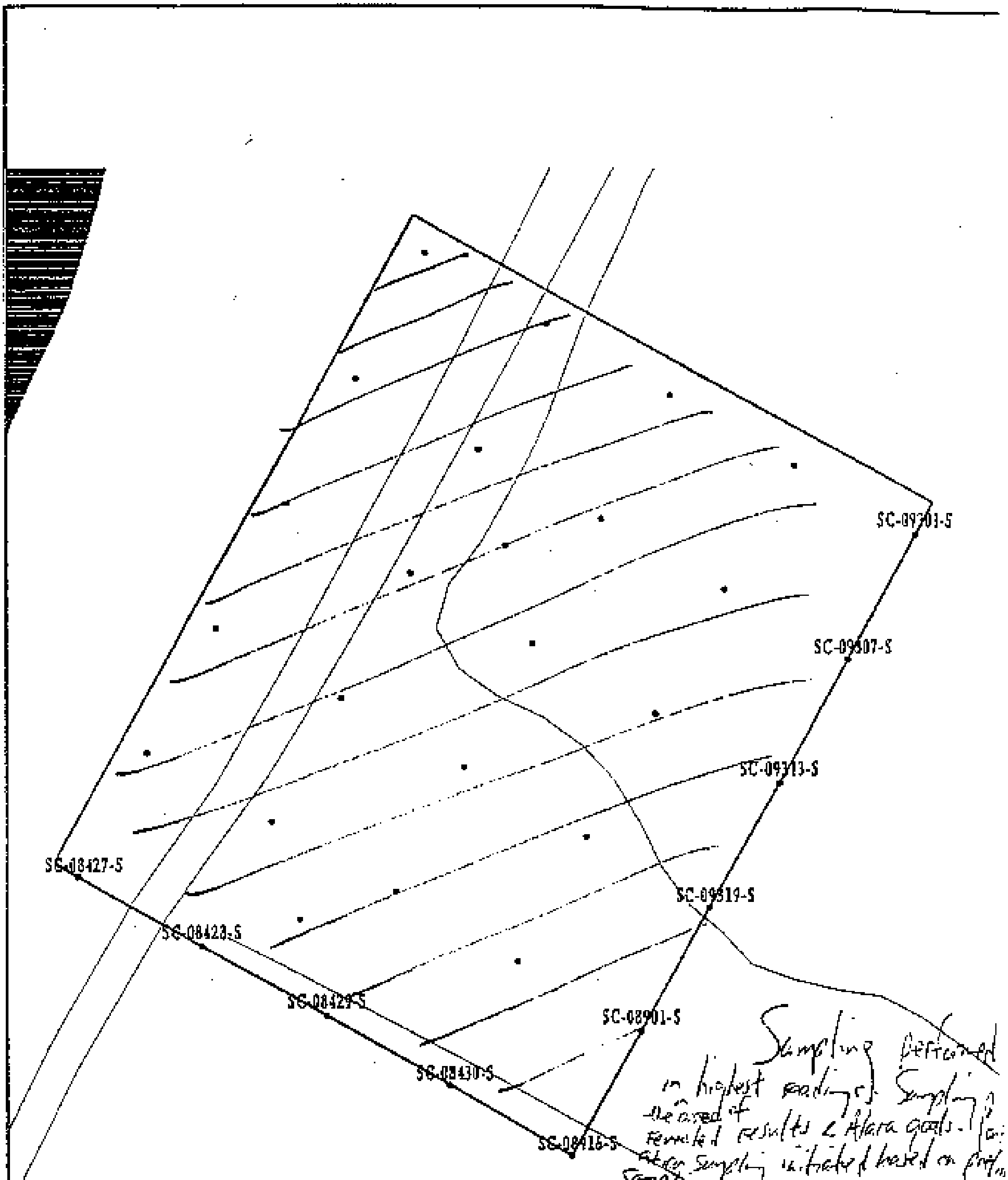
Calibration Due: 3-6-97, 2-7-97 Calibration Due: 4-3-97, 6-12-97

Survey Date/Time: 9-11-96 0900 - 1600 Field Bkg.: 5,500 / 6,000 cpm

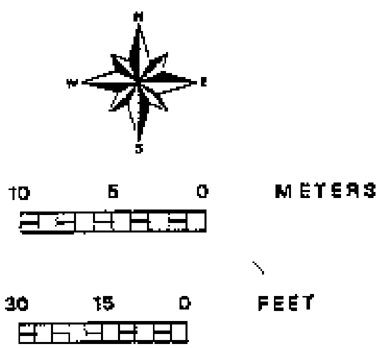
Surveyor(s): T. Butzlaff / L. Hagoss

Comments: The above marked area was surveyed and was found to be less than 1.5 times background.

Radiation Survey Form WP 420, RU008CU084



Sampling performed in highest readings. Sampling ceased if the area of reported results < Alara goals. [illegible] after sampling initiated based on [illegible] sampling



Meter Model#: 44-10

Meter Serial#: 127252 / 125433

Calibration Due: 3-6-97 / 2-7-97

Detector Model#: 2X2 NaI

Detector Serial#: 122608-I / 4240-F

Calibration Due: 4-3-97 / 6-12-97

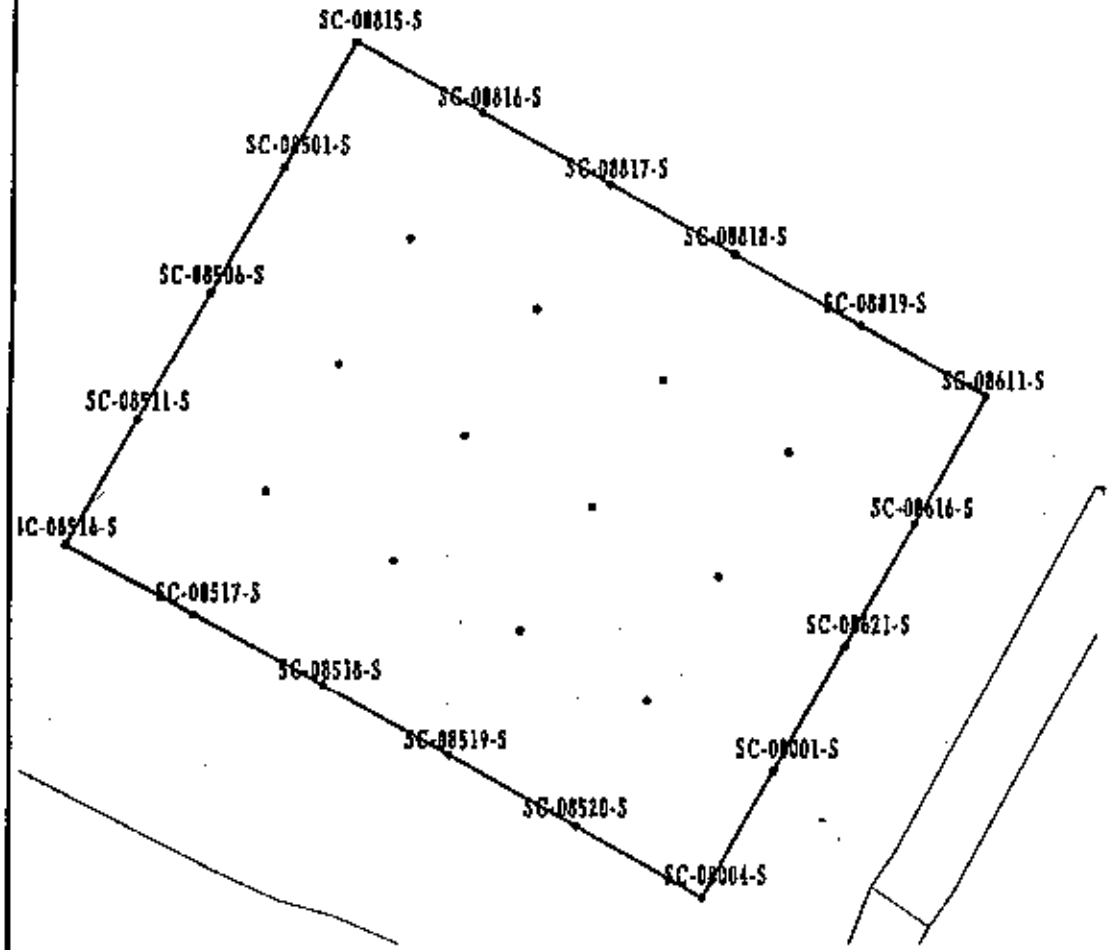
Survey Date/Time: 10-18-96 0830

Field Bkg.: 5500 cpm / 4,000 cpm

Surveyor(s): Todd Butzlaff, Tony Lukezic

Comments: THE ABOVE AREA WAS SURVEYED AND WAS ABOVE 1.5X BKGD. BOTH WERE SHIELDED. SAMPLING WILL BE DOWN PER "SHINE" FROM P.4#3 PER JASON AND DAN HOFFMAN. [illegible]

Radiation Survey Form WP 420, RU008CU085



10 5 0 10 METERS

30 15 0 30 FEET

N
W E
S

Meter Model#: 44-10 Detector Model#: 2x2 NaI

Meter Serial#: 127252, 6125433 Detector Ser(al)#: 122608 I 4240-F

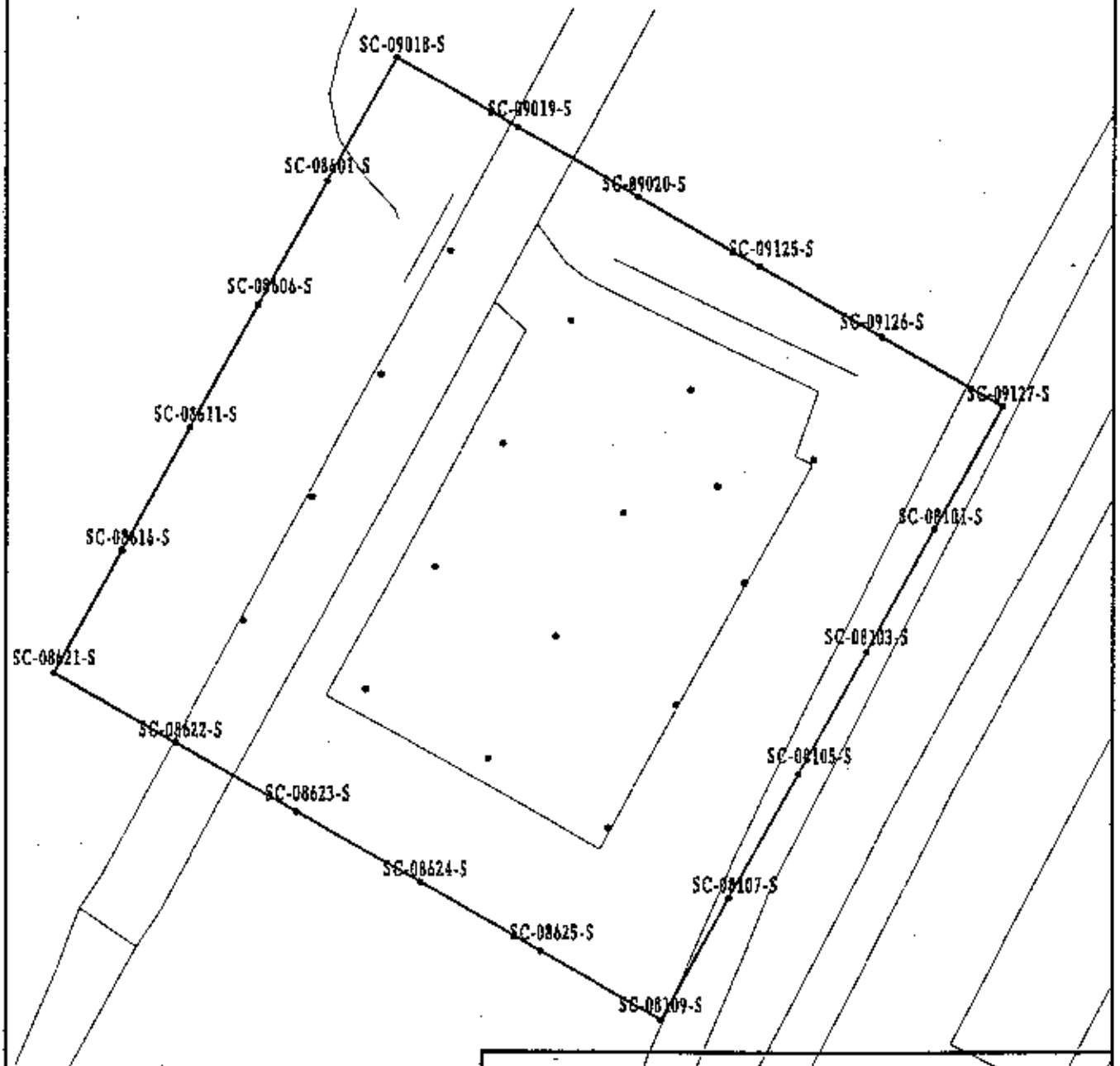
Calibration Due: 3-6-97, 2-7-97 Calibration Due: 4-3-97, 6-12-97

Survey Date/Time: 9-11-96 (0900-1600) Field Bkg.: 5800 cpm, 6000 cpm

Surveyor(s): L. Hagoss, & Todd Butzhoff

Comments: The above area has been Surveyed and found to be less than 1.5X back ground.

Radiation Survey Form WP 420, RU008CU086



Meter Model#: 44-10 Detector Model#: 2x2 NaI

Meter Serial#: 127252, 166701 Detector Serial#: 122608-I, 035449-D

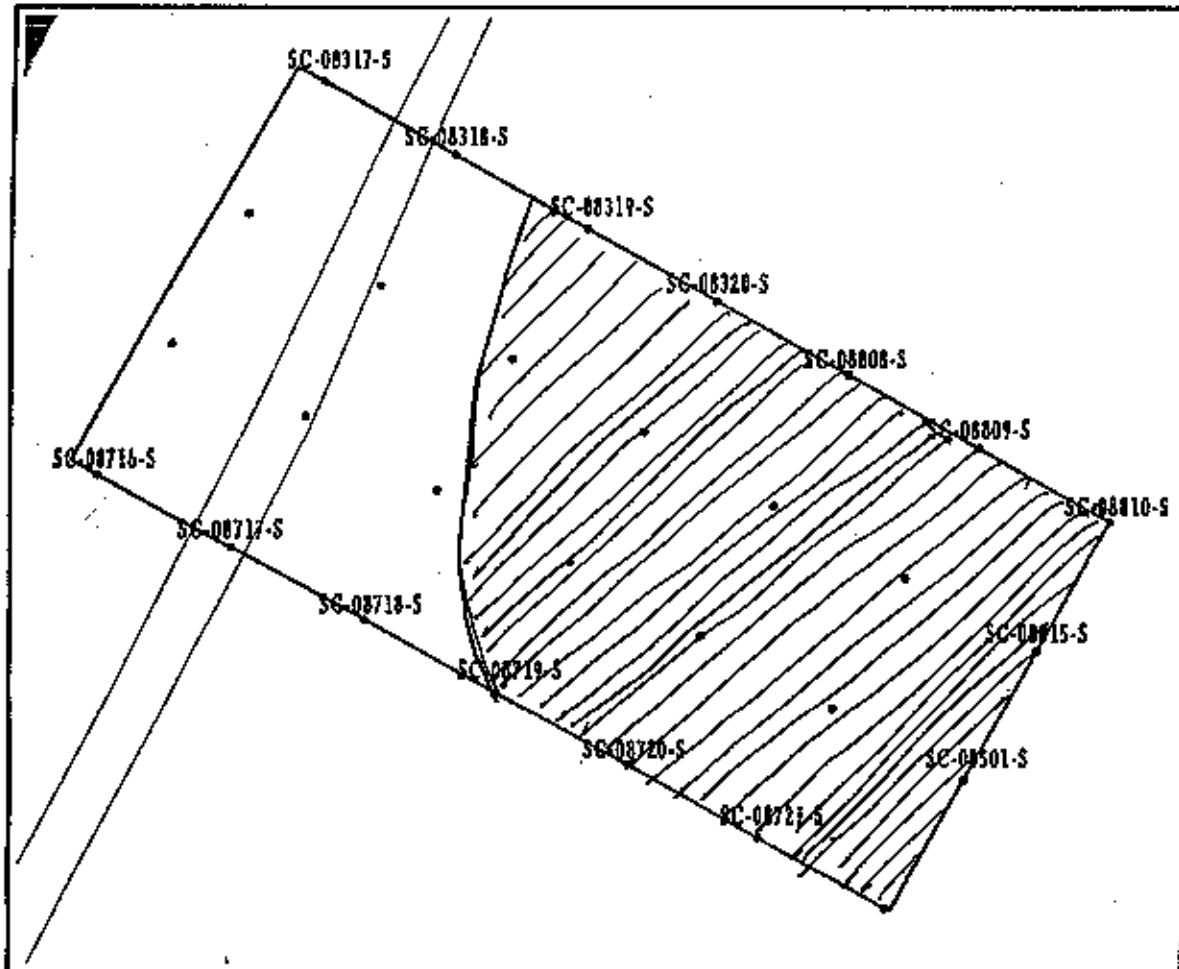
Calibration Due: 3-6-97, 2-7-97 Calibration Due: 4-3-97, 7-1-97

Survey Date/Time: 10-3-96, 1300-1530 Field Bkg.: 12,000 / 9,400 cpm

Surveyor(s): T. Butzloff / L. Hagess

Comments: The above area was surveyed and was found to be less than 1.5 times background.

Radiation Survey Form WP 420, RU008CU087



10 5 0 10 METERS

30 15 0 30 FEET

N E S W

Meter Model#: 44-10 Detector Model#: 2x2 NaI

Meter Serial#: 12.7252, & 125453 Detector Serial#: 122608I, 42406C

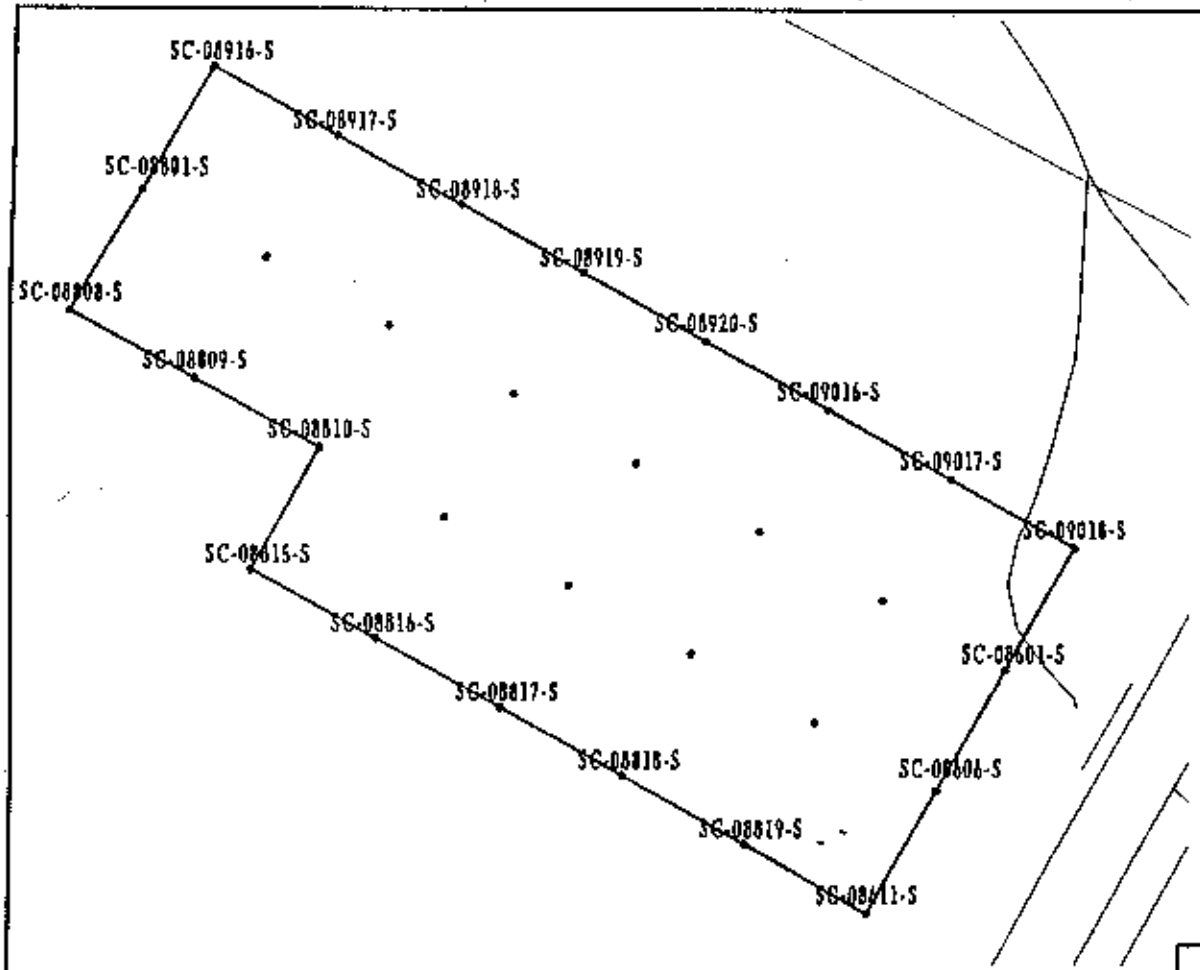
Calibration Due: 3-6-97, 2-7-97 Calibration Due: 4-3-97, 6-12-97

Survey Date/Time: 9-11-96 0900-1600 Field Bkg.: 5800, & 6000 cpm

Surveyor(s): L. Hagoss & Todd Buttloff

Comments: The above area has been surveyed and found to be less than 1.5X back-ground.

Radiation Survey Form WP 420, RU008CU088



10 5 0 10 METERS

30 15 0 30 FEET

N E S

Meter Model#: 44-10 Detector Model#: 2x2 NaI

Meter Serial#: 127252, 125433 Detector Serial#: 122608-I (Shielded) 4240-F (Shielded)

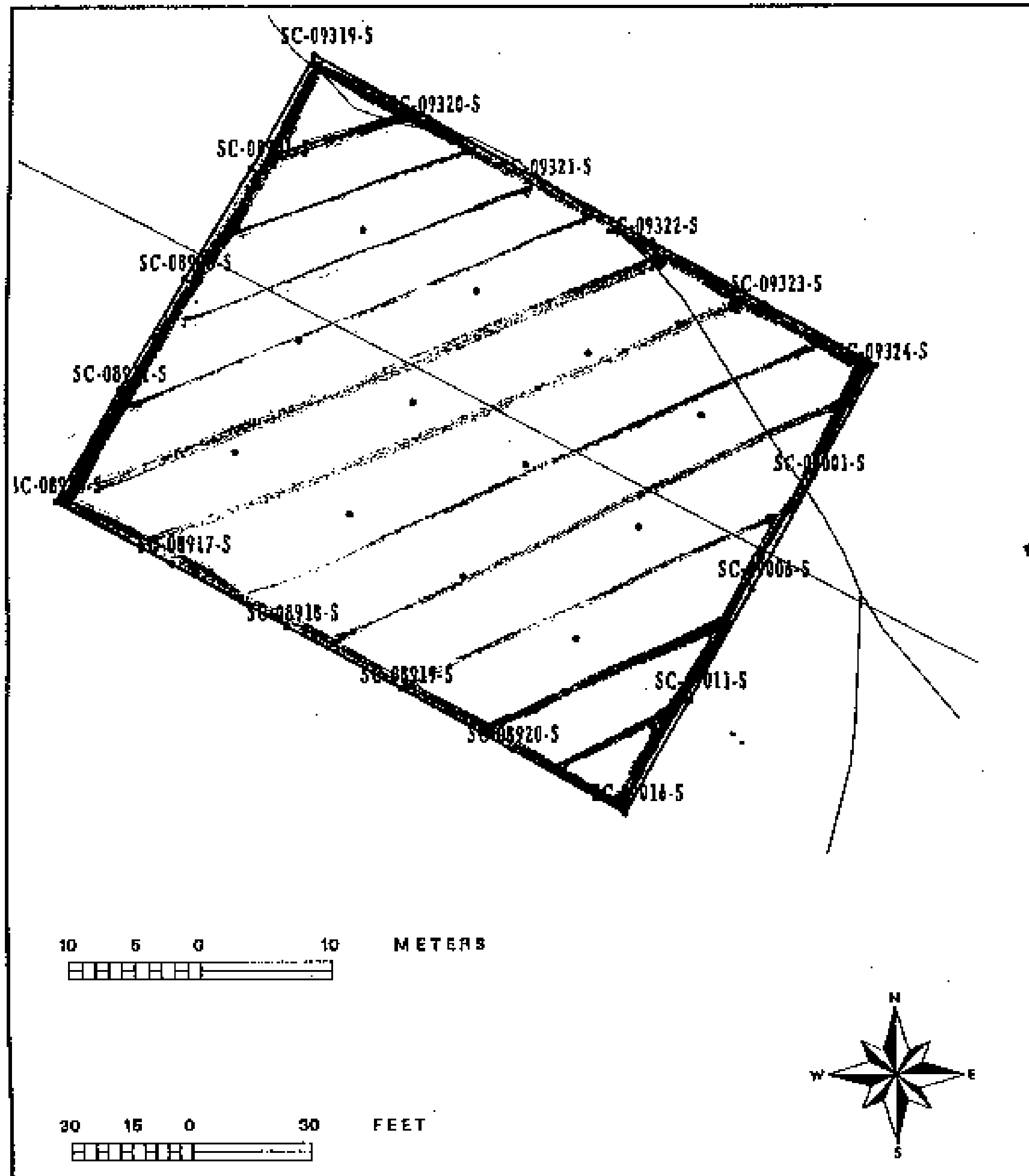
Calibration Due: 3-6-97, 2-7-97 Calibration Due: 4-3-97, 6-2-97

Survey Date/Time: 9-12-96 0500-1030 Field Bkg.: 6,100 cpm / 5,300 cpm

Surveyor(s): T. Butzloff / L. Hagoss

Comments: The above area was surveyed and was found to be less than 1.5 times background.

Radiation Survey Form WP 420, RU008CU089



Meter Model#: 2221

Detector Model#: 44-10 (2x2)

Meter Serial#: 4331/2172

Detector Serial#: 4240/4327

Calibration Due: 2-7-97/3-13-97

Calibration Due: 6-12-97/4-3-97

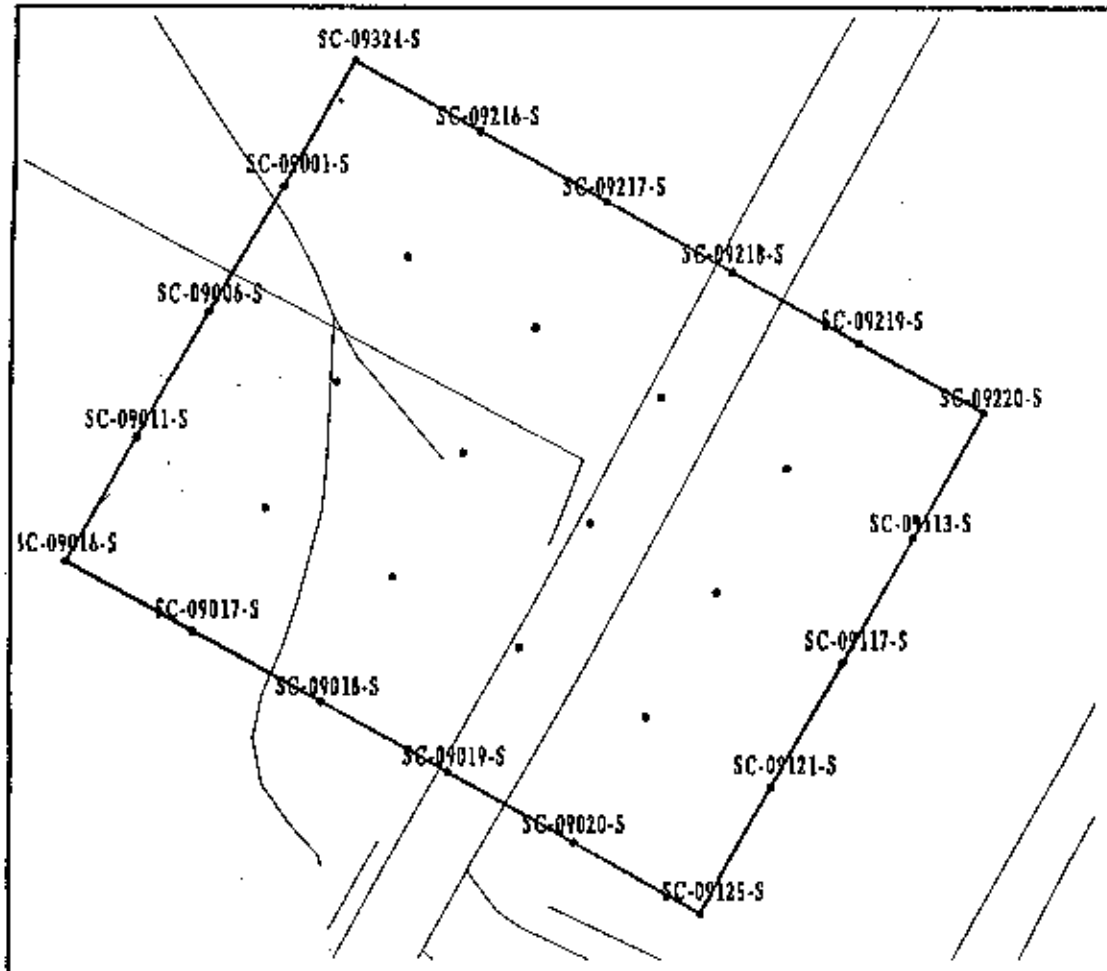
Survey Date/Time: 9-11-96/1230-2140

Field Bkg.: 5300 / 6000

Surveyor(s): B. McClane, J. Geyer

Comments: All areas indicated above in CU89 have been surveyed & were found to be < 1.5 x bkg.

Radiation Survey Form WP 420, RU008CU090



10 5 0 10 METERS

30 15 0 30 FEET

N E S

Meter Model#: 44-10 Detector Model#: 2x2 NaI

Meter Serial#: 125433, 10657O1 Detector Serial#: 4240-F 035449-D

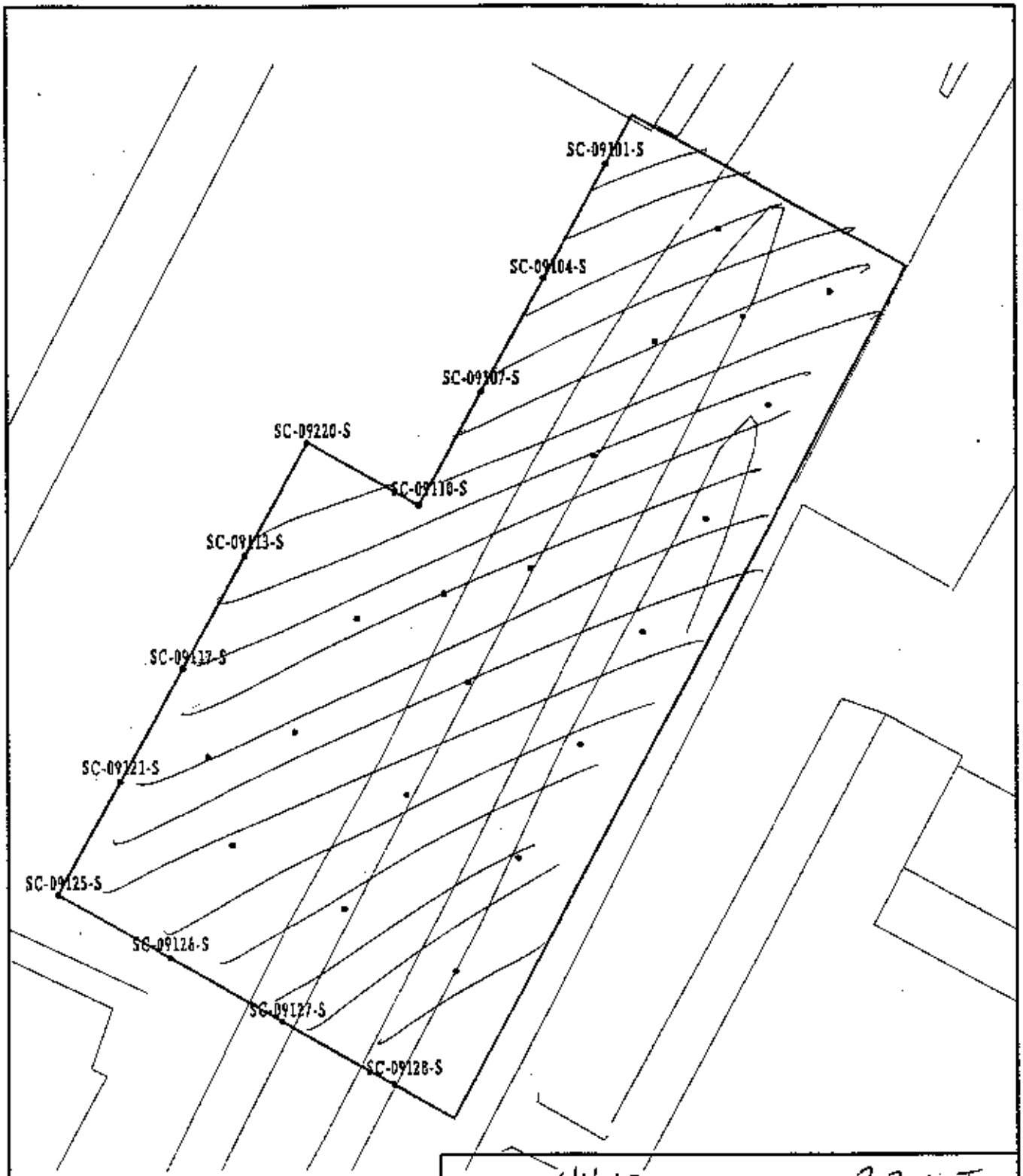
Calibration Due: 2-7-97, 2-7-97 Calibration Due: 6-12-97, 7-1-97

Survey Date/Time: 10-4-96 0845-1130 Field Bkg.: 10,000 / 10,000 cpm

Surveyor(s): T. Butzloff / T. Lukezic

Comments: The above area was surveyed and found to be less than 1.5 times background.

Radiation Survey Form WP 420, RU008CU091



Meter Model#: 44-10 Detector Model#: 2x2 NaI

Meter Serial#: 127252, 106701 Detector Serial#: 122466-I, 53466-D

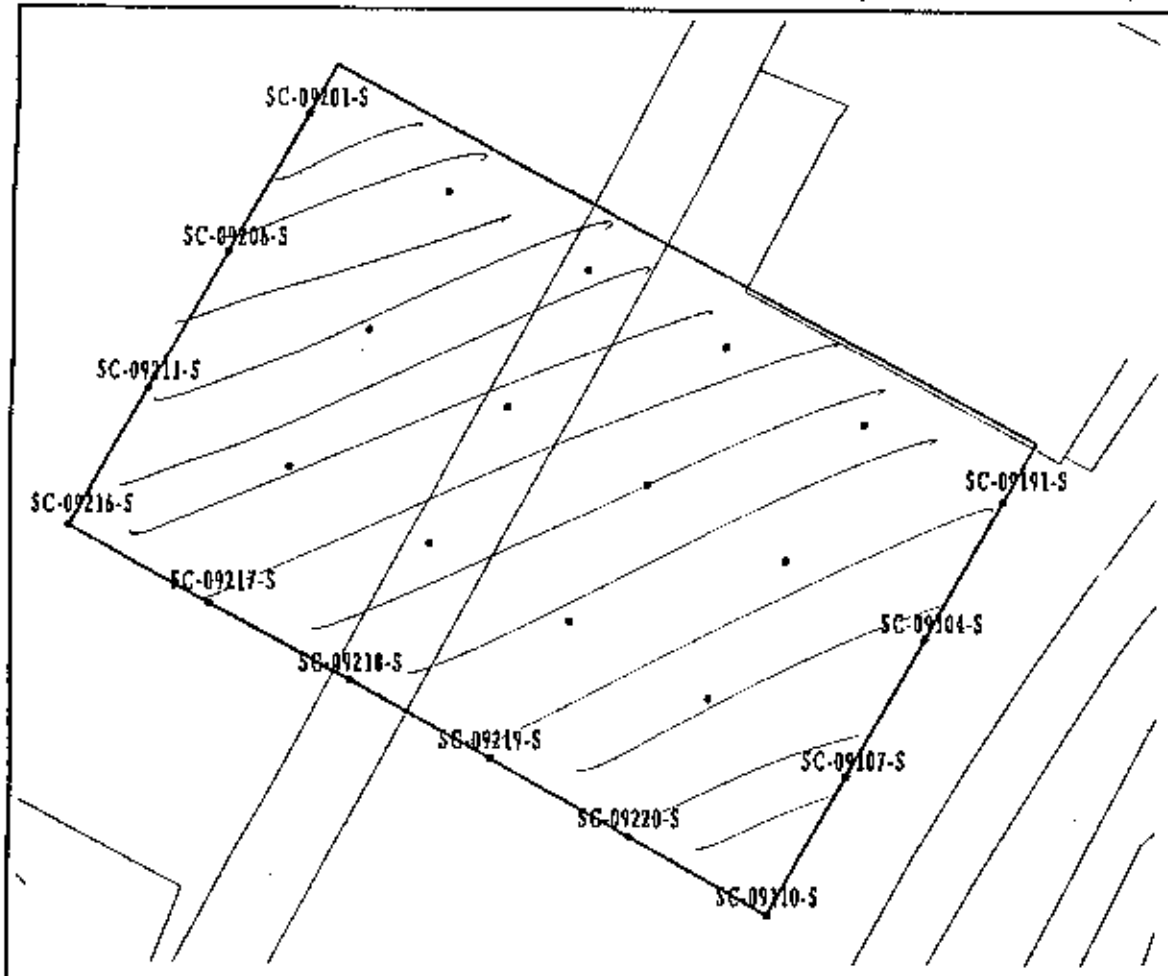
Calibration Due: 3-6-97, 2-7-97 Calibration Due: 4-3-97, 7-1-97

Survey Date/Time: 10-9-96 0700-0945 Field Bkg.: 11,000 / 10,000 cpm

Surveyor(s): T. Butzloff / B. McClane

Comments: The above area was surveyed and found to be less than 1.5 times background.

Radiation Survey Form WP 420, RU008CU092



10 5 0 10 METERS

30 15 0 30 FEET

N S

Meter Model#: 44-10 Detector Model#: 2x2 NaI

Meter Serial#: 125433, 106701 Detector Serial#: 4240-5 035445-D

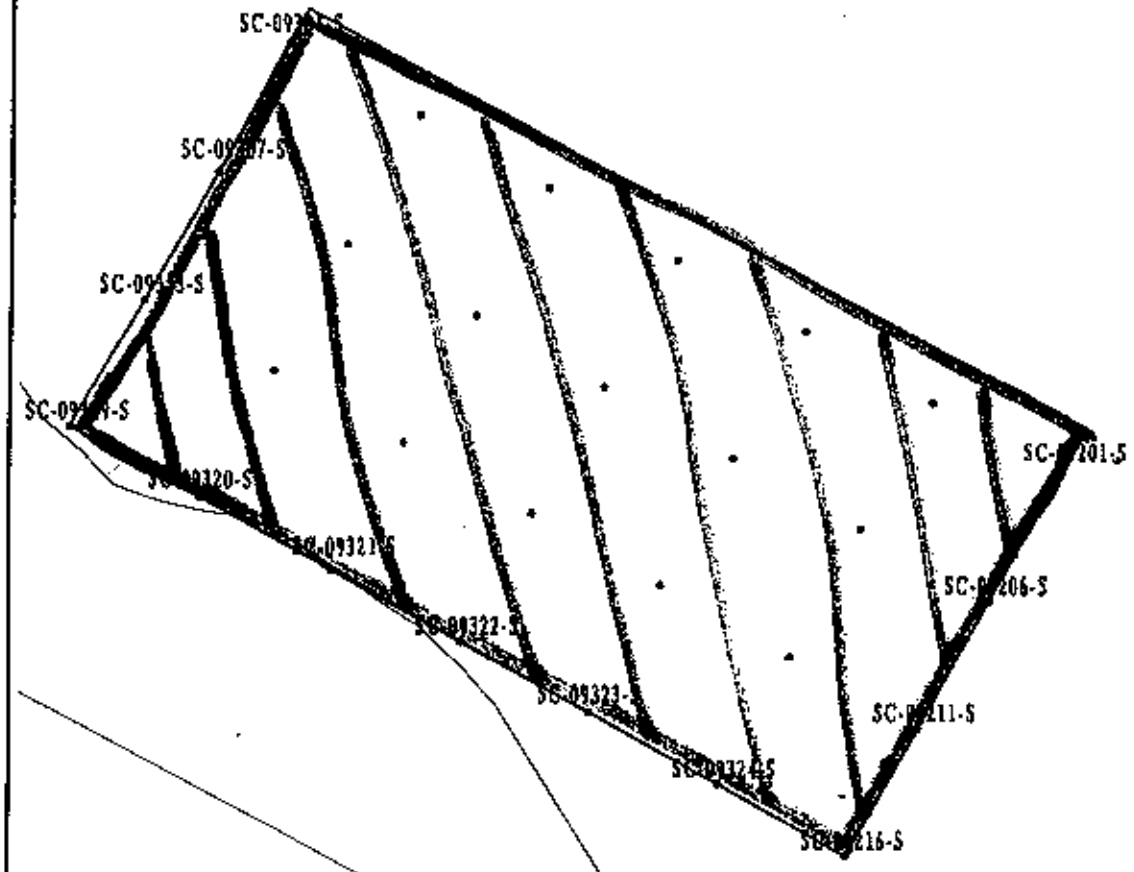
Calibration Due: 2-7-97, 2-7-97 Calibration Due: 6-12-97, 7-1-97

Survey Date/Time: 10-9-96 1300-1500 Field Bkg.: 10,500/10,000 cpm

Surveyor(s): T. Bubzloff / T. Lukezic

Comments: The above area was surveyed and found to be less than 1.5 times background.

Radiation Survey Form WP 420, RU008CU093



Area Surveyed 9-11-96

10 5 0 10 METERS

30 15 0 30 FEET

N E S

Meter Model#: 2221 Detector Model#: 44-10 (2x2)

Meter Serial#: 4331/2172 Detector Serial#: 4240/4327

Calibration Due: 2-7-97/3-13-97 Calibration Due: 6-12-97/4-3-97

Survey Date/Time: 9-11-96/1730-2030 Field Bkg.: 5200/6000

Surveyor(s): B. McClane, F. Algutifan

Comments: All areas within CU93 were surveyed & found to be <1.5X Bkg.

APPENDIX C

Disposition Forms

Weldon Spring Site Remedial Action Project
7295 Highway 94 South, St. Charles, Missouri, 63304

ES&H 1.2.1.1, Rev. 1, 03/96

SOIL CONFIRMATION REMEDIATION DISPOSITION FORM

SECTION I

1. Work Package Number: WP 420 2. Date: 10/18/96 3. Review Form #: 96-087

4. Remediation Unit Number: RU008 5. Confirmation Unit Number: CU080 (map attached)

6. Contaminants of Concern: X U-238 X Th-230 ___ Th-232 X Ra-226 X Ra-228
___ TNT X PCB ___ PAH X As X Cr X Pb ___ Tl

7. Results average below ALARA goal(s)?	X Yes ___ No
8. All results below cleanup criteria?	X Yes ___ No
9. Any results greater than 3X criteria?	___ Yes X No
10. Hotspots present (less than 3X criteria)?	___ Yes X No

Parameter	Size	Concentration	Complies with Plan?
N/A			___ Yes ___ No
			___ Yes ___ No
			___ Yes ___ No
			___ Yes ___ No

11. Reviewer: Melissa A. Lutz Date: 10/18/96

12. Reviewer Disposition Recommendation: X Release for Unrestricted Use (Section II)
___ Additional Excavation Required (Section IV)
___ ALARA Committee Required (Section III)

SECTION II *Results are ALARA. CU is released for unrestricted use.*

14. ES&H Manager: [signature] Date: 10/21/96

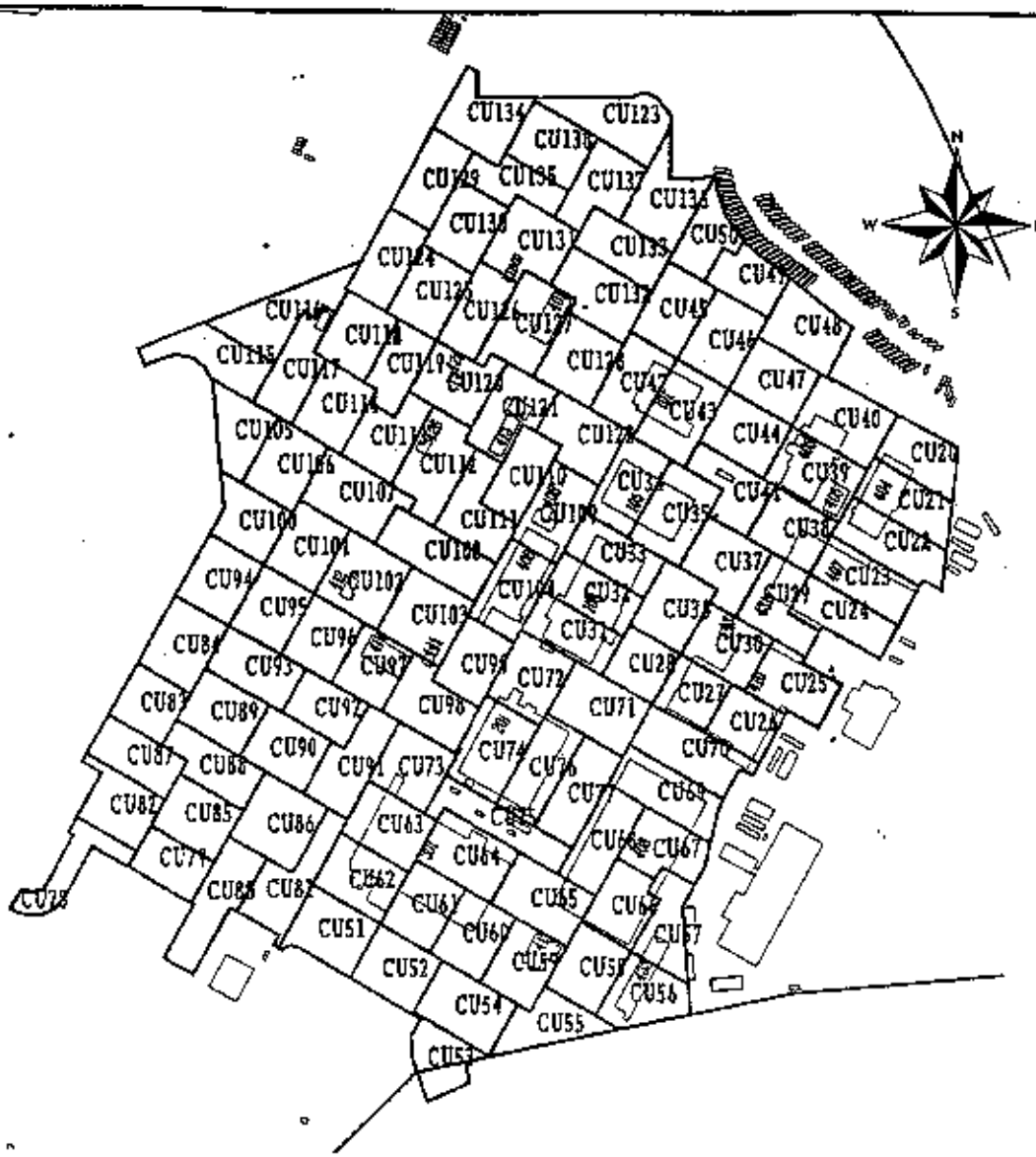
15. DOE Project Manager/Engineer: [signature] Date: 10/21/96

16. Project Manager: [signature] Date: 10/21/96

17. Construction Engineer: [signature] Date: 10/21/96

SEE ATTACHED RESULTS AND MAP

Note: This CU has a new boundary.



LEGEND

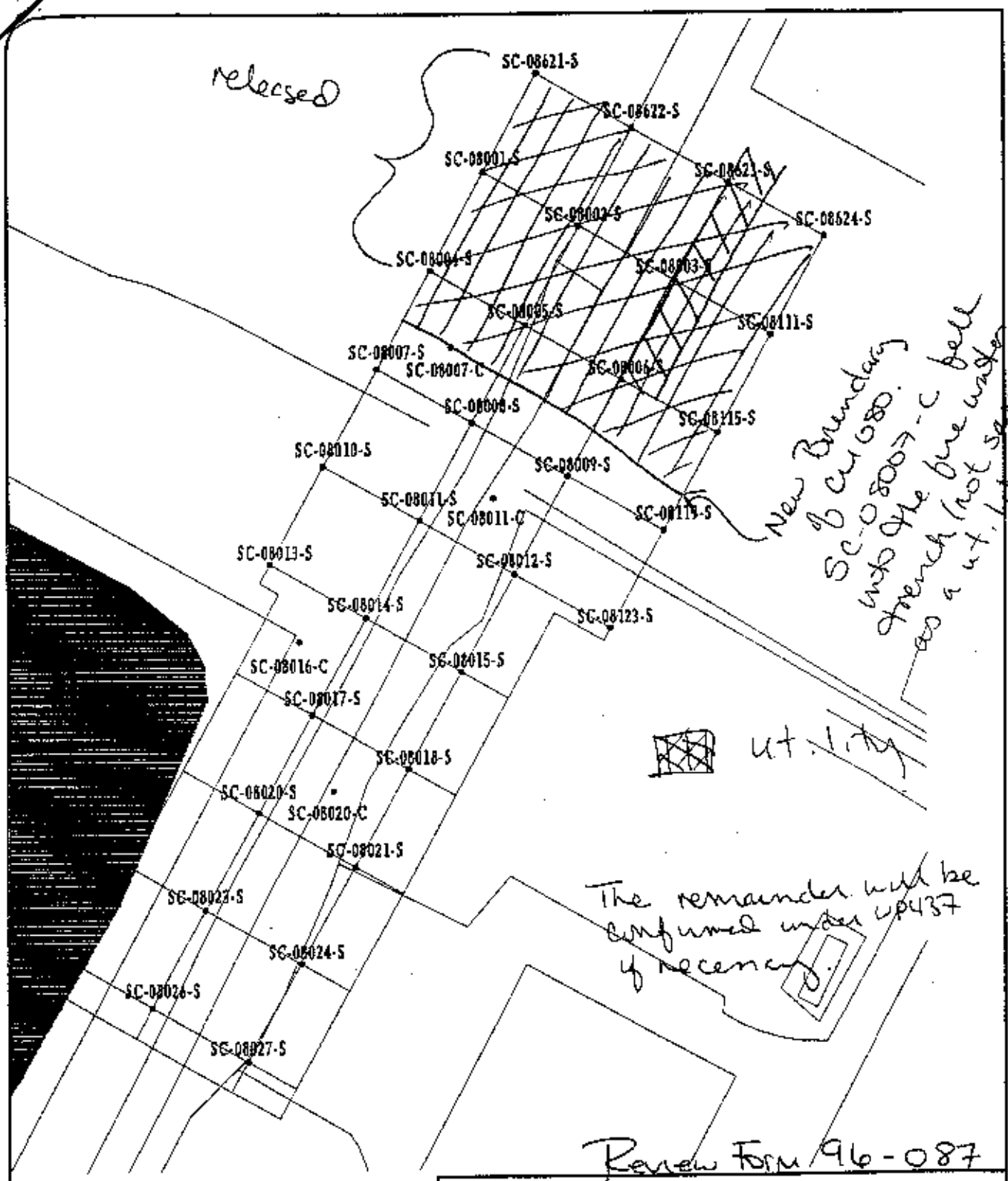
RU006 -- CU020 THRU CU050
RU007 -- CU051 THRU CU077
RU008 -- CU078 THRU CU093
RU009 -- CU094 THRU CU122
RU010 -- CU123 THRU CU138

Review Form # 96-087

Remedial Units for WP-420

Figure: 1-1

REPORT NO.:	DOE/OR/21548-590	EXHIBIT NO.:	E/CP/006/0196		
ORIGINATOR:	EMD	DRAWN BY:	WSSRAP	DATE:	01/96



Sample Locations in Remedial Unit RU008 Confirmation Unit CU080

Figure B-61

EXHIBIT NO.: A/CP/143/1295		REPORT NO.: DOE/OR/21548-590	
ORIGINATOR: MGL	DRAWN BY: WSSRAP GIS	DATE: 3/96	

CU080 DATA REPORT

URANIUM-238

NUMBER OF URANIUM-238 SAMPLES IN DATABASE FOR THIS CU IS: 17

PARAMETER	LOCATION	CONC	DL	UNITS
URANIUM-238	SC-08621-S	7.45	3.17	PCI/G
URANIUM-238	SC-08622-S	1.98	3.95	PCI/G
URANIUM-238	SC-08001-S	2.23	4.47	PCI/G
URANIUM-238	SC-08623-S	5.66	2.87	PCI/G
URANIUM-238	SC-08002-S	2.19	4.39	PCI/G
URANIUM-238	SC-08624-S	15.83	3.41	PCI/G
URANIUM-238	SC-08004-S	2.35	2.61	PCI/G
URANIUM-238	SC-08003-S	5.41	2.11	PCI/G
URANIUM-238	SC-08005-S	1.95	3.89	PCI/G
URANIUM-238	SC-08111-S	9.13	3.20	PCI/G
URANIUM-238	SC-08007-S	1.54	3.08	PCI/G
URANIUM-238	SC-08006-S	2.99	1.88	PCI/G
URANIUM-238	SC-08008-S	2.10	4.19	PCI/G
URANIUM-238	SC-08115-S	7.31	2.81	PCI/G
URANIUM-238	SC-08009-S	1.43	2.85	PCI/G
URANIUM-238	SC-08119-S	2.31	4.61	PCI/G
URANIUM-238	SC-08007-C	1.90	3.79	PCI/G

Average of URANIUM-238 values is 4.34 PCI/G, which is below ALARA, 30.00 PCI/G.
Maximum single value is 15.83 PCI/G, which is below criteria, 120.00 PCI/G.

THORIUM-230

NUMBER OF Thorium-230 SAMPLES IN DATABASE FOR THIS CU IS: 5

PARAMETER	LOCATION	CONC	DL	UNITS
Thorium-230	SC-08623-S	1.39	0.72	PCI/G
Thorium-230	SC-08003-S	1.15	0.72	PCI/G
Thorium-230	SC-08007-S	1.07	0.72	PCI/G
Thorium-230	SC-08006-S	1.13	0.72	PCI/G
Thorium-230	SC-08007-C	1.05	0.72	PCI/G

Average of Thorium-230 values is 1.16 PCI/G, which is below ALARA, 5.00 PCI/G.
Maximum single value is 1.39 PCI/G, which is below criteria, 6.20 PCI/G.

CU080 DATA REPORT (CONTINUED)

RADIUM-226

NUMBER OF RADIUM-226 SAMPLES IN DATABASE FOR THIS CU IS: 3

PARAMETER	LOCATION	CONC	DL	UNITS
RADIUM-226	SC-08623-S	2.47	0.29	PCI/G
RADIUM-226	SC-08003-S	2.72	0.30	PCI/G
RADIUM-226	SC-08006-S	2.75	0.32	PCI/G

Average of RADIUM-226 values is 2.65 PCI/G, which is below ALARA, 5.00 PCI/G.
Maximum single value is 2.75 PCI/G, which is below criteria, 6.20 PCI/G.

RADIUM-228

NUMBER OF RADIUM-228 SAMPLES IN DATABASE FOR THIS CU IS: 3

PARAMETER	LOCATION	CONC	DL	UNITS
RADIUM-228	SC-08623-S	1.39	0.38	PCI/G
RADIUM-228	SC-08003-S	1.22	0.37	PCI/G
RADIUM-228	SC-08006-S	1.03	0.36	PCI/G

Average of RADIUM-228 values is 1.21 PCI/G, which is below ALARA, 5.00 PCI/G.
Maximum single value is 1.39 PCI/G, which is below criteria, 6.20 PCI/G.

ARSENIC

NUMBER OF Arsenic SAMPLES IN DATABASE FOR THIS CU IS: 3

PARAMETER	LOCATION	CONC	DL	UNITS
Arsenic	SC-08623-S	34.10	0.45	UG/G
Arsenic	SC-08003-S	8.30	0.42	UG/G
Arsenic	SC-08006-S	7.30	0.41	UG/G

Average of Arsenic values is 16.57 UG/G, which is below ALARA, 45.00 UG/G.
Maximum single value is 34.10 UG/G, which is below criteria, 75 UG/G.

CU080 DATA REPORT (CONTINUED)

CHROMIUM

NUMBER OF 'Chromium' SAMPLES IN DATABASE FOR THIS CU IS: 3

PARAMETER	LOCATION	CONC	DL	UNITS
Chromium	SC-08623-S	16.70	0.38	UG/G
Chromium	SC-08003-S	15.90	0.35	UG/G
Chromium	SC-08006-S	13.40	0.34	UG/G

Average of Chromium values is 15.33, which is below ALARA, 90.00
Maximum single value is 16.70, which is below criteria, 110.00

LEAD

NUMBER OF 'Lead' SAMPLES IN DATABASE FOR THIS CU IS: 3

PARAMETER	LOCATION	CONC	DL	UNITS
Lead	SC-08623-S	18.50	0.20	UG/G
Lead	SC-08003-S	10.10	0.19	UG/G
Lead	SC-08006-S	12.50	0.18	UG/G

Average of Lead values is 13.70 UG/G, which is below ALARA, 240.00 UG/G.
Maximum single value is 18.50 UG/G, which is below criteria, 450 UG/G.

PCB

NUMBER OF 'PCB' SAMPLES IN DATABASE FOR THIS CU IS: 3

PARAMETER	LOCATION	CONC	DL	UNITS
PCB	SC-08623-S	276	42	UG/KG
PCB	SC-08003-S	0	38	UG/KG
PCB	SC-08006-S	0	38	UG/KG

Average of PCB values is 92 UG/KG, which is below ALARA, 650 UG/KG.
Maximum single value is 276 UG/KG, which is below criteria, 8000 UG/KG.

Weldon Spring Site Remedial Action Project
7295 Highway 94 South, St. Charles, Missouri, 63304

ES&H 1.2.1.1, Rev. 1, 03/96

SOIL CONFIRMATION REMEDIATION DISPOSITION FORM

SECTION I

1. Work Package Number: WP 420 2. Date: 10/18/96 3. Review Form #: 96-076

4. Remediation Unit Number: RU008 5. Confirmation Unit Number: CU081 (map attached)

6. Contaminants of Concern: X U-238 ___ Th-230 ___ Th-232 X Ra-226 X Ra-228
___ TNT ___ PCB ___ PAH ___ As ___ Cr ___ Pb ___ Tl

7. Results average below ALARA goal(s)?	X Yes ___ No
8. All results below cleanup criteria?	X Yes ___ No
9. Any results greater than 3X criteria?	___ Yes X No
10. Hotspots present (less than 3X criteria)?	___ Yes X No

Parameter	Size	Concentration	Complies with Plan?
N/A			___ Yes ___ No
			___ Yes ___ No
			___ Yes ___ No
			___ Yes ___ No

11. Reviewer: Mel A. Lutz Date: 10/18/96

12. Reviewer Disposition Recommendation: X Release for Unrestricted Use (Section II)
___ Additional Excavation Required (Section IV)
___ ALARA Committee Required (Section III)

SECTION II *Results are ALARA. CU is released for unrestricted use.*

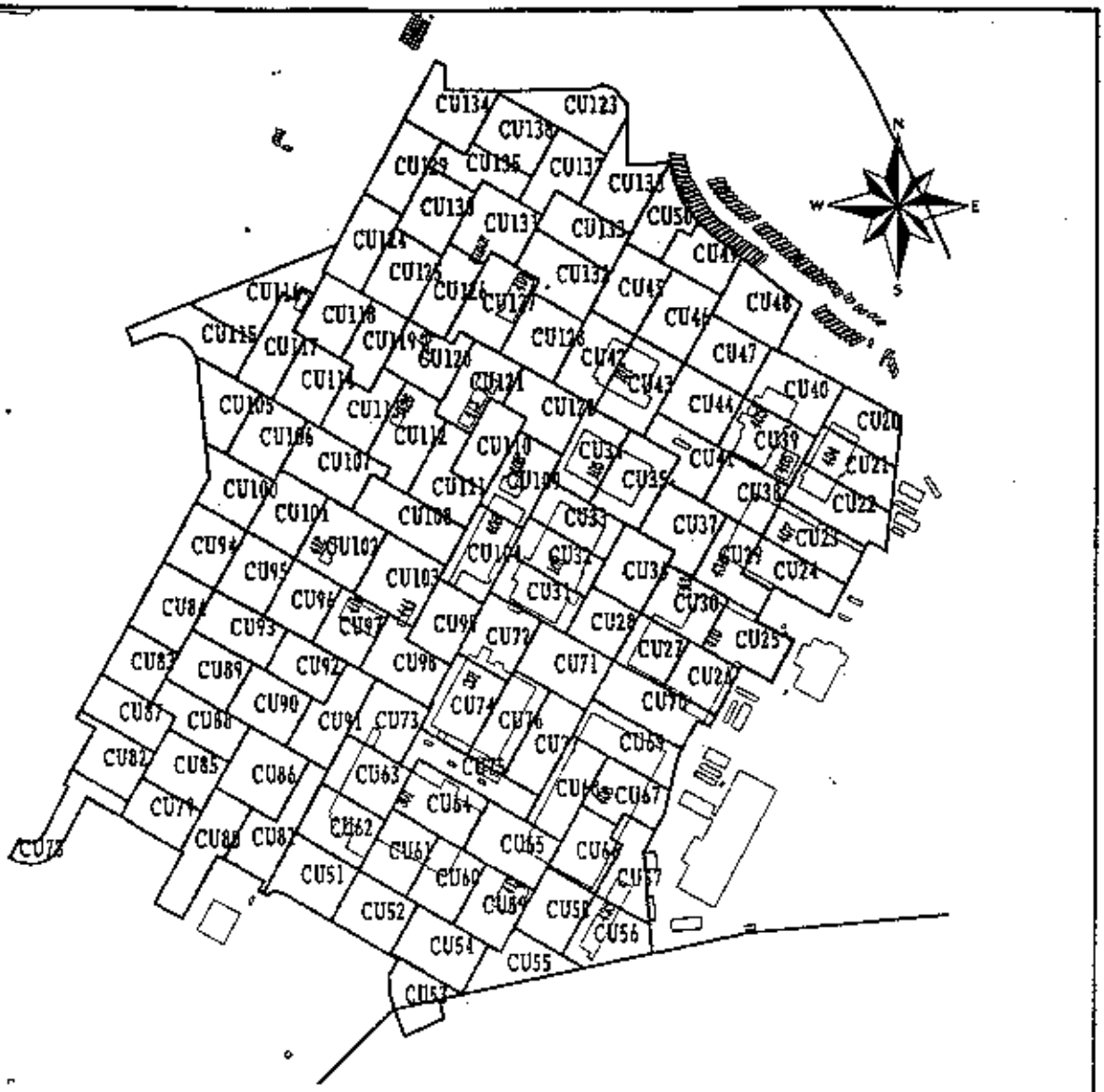
14. ES&H Manager: for Kam Date: 10/21/96

15. DOE Project Manager/Engineer: Thomas C. Fauley Date: ___

16. Project Manager: Joseph P. Schmitz Date: 10/21/96

17. Construction Engineer: Darrell L. Cappe Date: 10/21/96

SEE ATTACHED RESULTS AND MAP



LEGEND

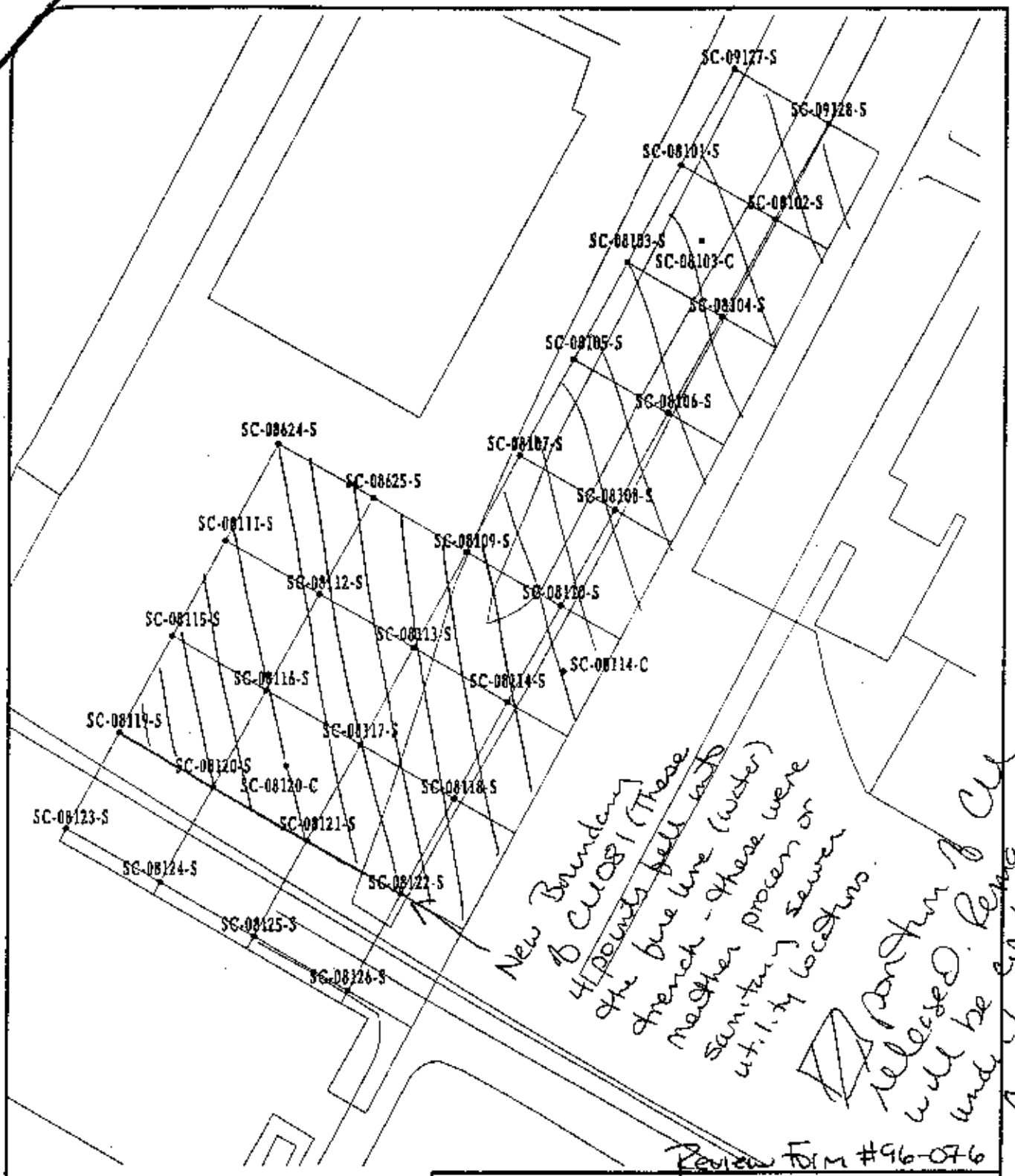
RU006 -- CU020 THRU CU050
RU007 -- CU051 THRU CU077
RU008 -- CU078 THRU CU093
RU009 -- CU094 THRU CU122
RU010 -- CU123 THRU CU138

Review Form # 96-076

Remedial Units for WP-420

Figure: 1-1

REPORT NO.: DOE/OR/21548-590		EXHIBIT NO.:	E/CP/006/0196
ORIGINATOR: EMD	DRAWN BY: WSSRAP	DATE:	01/96



Sample Locations in Remedial Unit RU008 Confirmation Unit CU081

Figure B-62

EXHIBIT NO.:	REPORT NO.:	
A/CP/144/1295	DOE/OR/21548-590	
ORIGINATOR: MGL	DRAWN BY: WSSRAP GIS	DATE: 3/96

CU081 DATA REPORT

URANIUM-238

NUMBER OF URANIUM-238 SAMPLES IN DATABASE FOR THIS CU IS: 29

PARAMETER	LOCATION	CONC	DL	UNITS
URANIUM-238	SC-09127-S	23.07	3.33	PCI/G
URANIUM-238	SC-09128-S	9.68	3.35	PCI/G
URANIUM-238	SC-08101-S	16.18	4.54	PCI/G
URANIUM-238	SC-08102-S	15.65	4.24	PCI/G
URANIUM-238	SC-08103-S	6.39	3.53	PCI/G
URANIUM-238	SC-08104-S	7.77	3.02	PCI/G
URANIUM-238	SC-08105-S-RS	9.64	3.72	PCI/G
URANIUM-238	SC-08106-S	13.94	3.99	PCI/G
URANIUM-238	SC-08107-S	10.32	3.64	PCI/G
URANIUM-238	SC-08624-S	15.83	3.41	PCI/G
URANIUM-238	SC-08625-S	17.65	4.79	PCI/G
URANIUM-238	SC-08108-S	14.13	2.47	PCI/G
URANIUM-238	SC-08111-S	9.13	3.20	PCI/G
URANIUM-238	SC-08109-S	4.97	9.94	PCI/G
URANIUM-238	SC-08112-S	7.44	2.74	PCI/G
URANIUM-238	SC-08110-S	13.07	4.11	PCI/G
URANIUM-238	SC-08115-S	7.31	2.81	PCI/G
URANIUM-238	SC-08113-S	3.72	3.05	PCI/G
URANIUM-238	SC-08116-S	5.07	3.74	PCI/G
URANIUM-238	SC-08114-S	12.78	4.92	PCI/G
URANIUM-238	SC-08119-S	2.31	4.61	PCI/G
URANIUM-238	SC-08117-S	2.00	4.00	PCI/G
URANIUM-238	SC-08120-S	1.92	1.78	PCI/G
URANIUM-238	SC-08118-S	2.92	2.53	PCI/G
URANIUM-238	SC-08121-S	1.29	2.66	PCI/G
URANIUM-238	SC-08122-S	2.98	2.43	PCI/G
URANIUM-238	SC-08103-C	11.68	2.45	PCI/G
URANIUM-238	SC-08114-C	16.64	3.66	PCI/G
URANIUM-238	SC-08120-C	2.04	4.07	PCI/G

9.22 mgk 04.10.97

Average of URANIUM-238 values is ~~9.64~~ PCI/G, which is BELOW_ALARA of 30.00 PCI/G.
Maximum single value is 23.07 PCI/G, which is BELOW_CRITERIA of 120.00 PCI/G.

CU081 DATA REPORT (CONTINUED)

RADIUM-226

NUMBER OF RADIUM-226 SAMPLES IN DATABASE FOR THIS CU IS: 1

PARAMETER	LOCATION	CONC	DL	UNITS
RADIUM-226	SC-08114-C	2.63	0.35	PCI/G

Average of RADIUM-226 values is 2.63 PCI/G, which is below ALARA, 5.00 PCI/G.
Maximum single value is 2.63 PCI/G, which is below criteria, 6.20 PCI/G.

RADIUM-228

NUMBER OF RADIUM-228 SAMPLES IN DATABASE FOR THIS CU IS: 1

PARAMETER	LOCATION	CONC	DL	UNITS
RADIUM-228	SC-08114-C	1.22	0.48	PCI/G

Average of RADIUM-228 values is 1.22 PCI/G, which is below ALARA, 5.00 PCI/G.
Maximum single value is 1.22 PCI/G, which is below criteria, 6.20 PCI/G.

Weldon Spring Site Remedial Action Project
7295 Highway 94 South, St. Charles, Missouri, 63304

ES&H 1.2.1.1, Rev. 1, 03/96

SOIL CONFIRMATION REMEDIATION DISPOSITION FORM

SECTION I

1. Work Package Number: WP420 2. Date: 09-17-96 3. Review Form #: 96-062

4. Remediation Unit Number: RU008 5. Confirmation Unit Number: CU082 (map attached)

6. Contaminants of Concern: X U-238 ____ Th-230 ____ Th-232 ____ Ra-226 ____ Ra-228
____ TNT ____ PCB ____ PAH ____ As ____ Cr ____ Pb ____ Tl

7. Results average below ALARA goal(s)?	X Yes ____ No
8. All results below cleanup criteria?	X Yes ____ No
9. Any results greater than 3X criteria?	____ Yes X No
10. Hotspots present (less than 3X criteria)?	____ Yes X No

Parameter	Size	Concentration	Complies with Plan?
N/A			____ Yes ____ No
			____ Yes ____ No
			____ Yes ____ No
			____ Yes ____ No

11. Reviewer: Mel A Lish Date: 9/17/96

12. Reviewer Disposition Recommendation: X Release for Unrestricted Use (Section II)
____ Additional Excavation Required (Section IV)
____ ALARA Committee Required (Section III)

SECTION II *Results are ALARA. CU is released for unrestricted use.*

14. ES&H Manager: for Date: 9/17/96

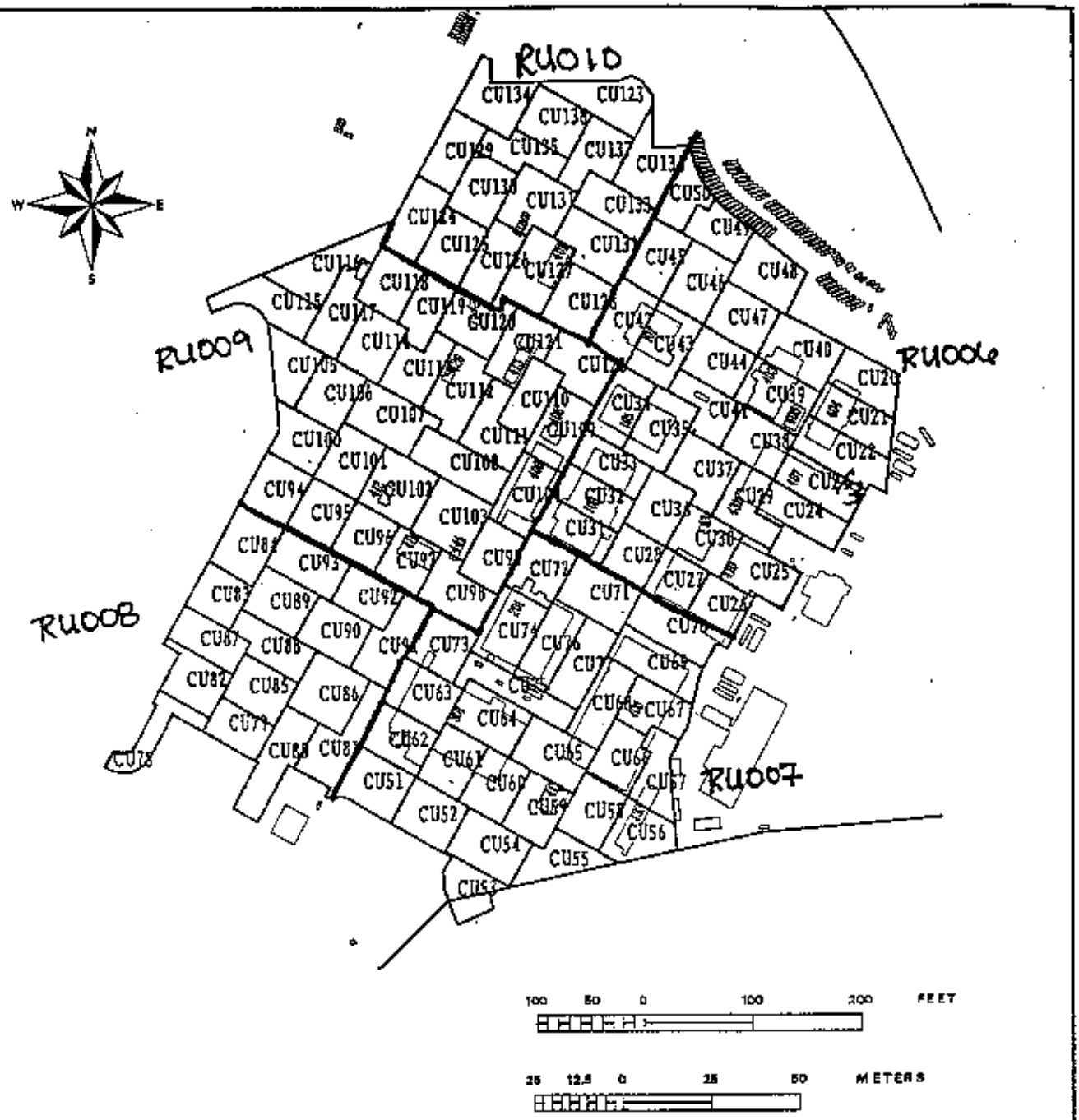
15. DOE Project Manager/Engineer: Date: 9/17/96

16. Project Manager: Date: 9/17/96

17. Construction Engineer: Daniel L. Coppa Date: 9/17/96

SEE ATTACHED RESULTS AND MAP

Note: (1) No Utilities
(2) Please note new boundaries. Remaining Portion will be captured under WP457.



LEGEND

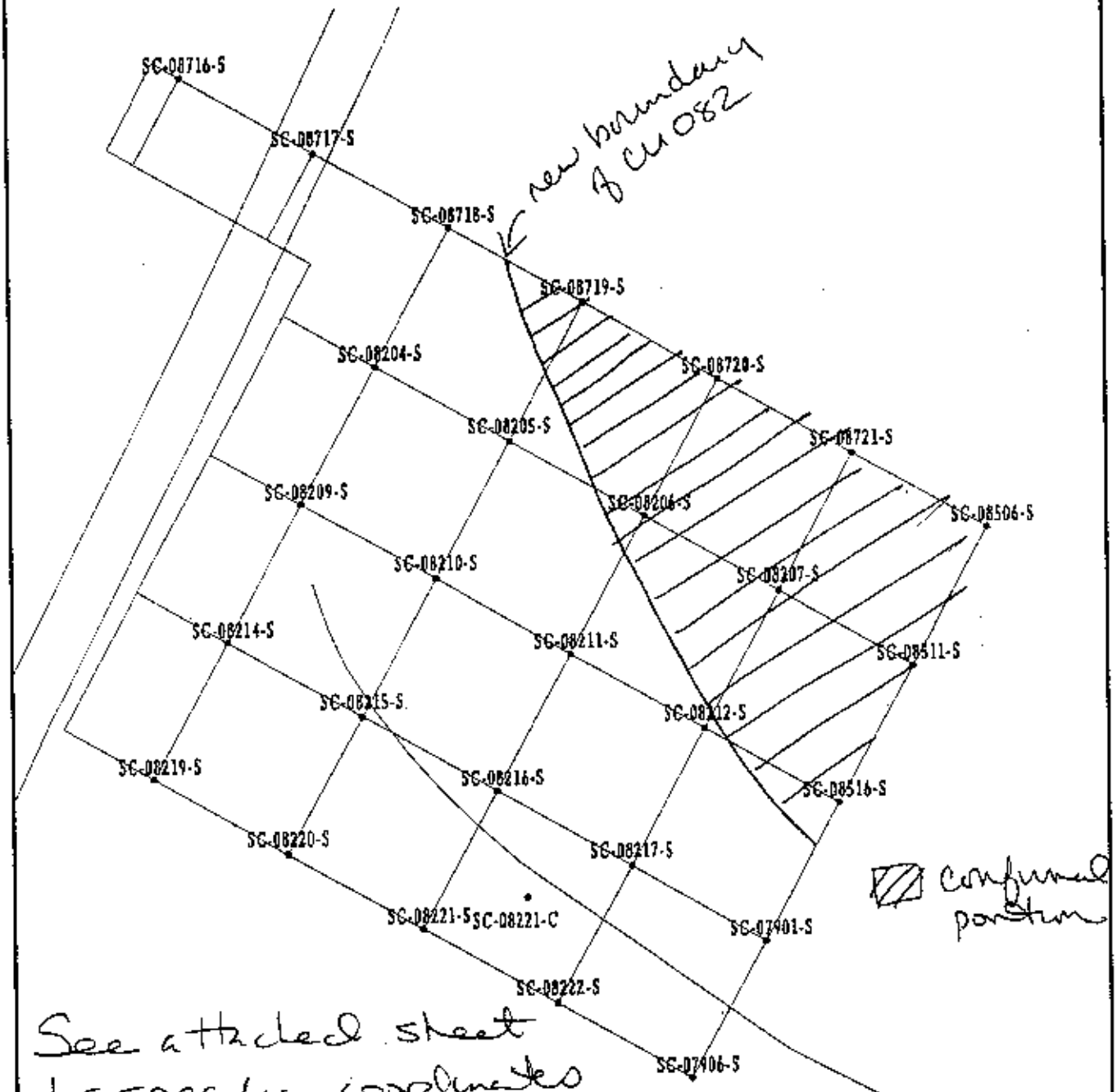
RU006 -- CU020 THRU CU050
RU007 -- CU051 THRU CU077
RU008 -- CU078 THRU CU093
RU009 -- CU094 THRU CU122
RU010 -- CU123 THRU CU138

Review Form# 96-062

Remedial Units for WP-420

Figure: 1-1

REPORT NO.: DOE/OR/21548-590	EXHIBIT NO.: E/CP/006/0196	
ORIGINATOR: EMD	DRAWN BY: WSSRAP GIS	DATE: 01/96



See attached sheet for specific coordinates of new boundary

Review Form #96-062

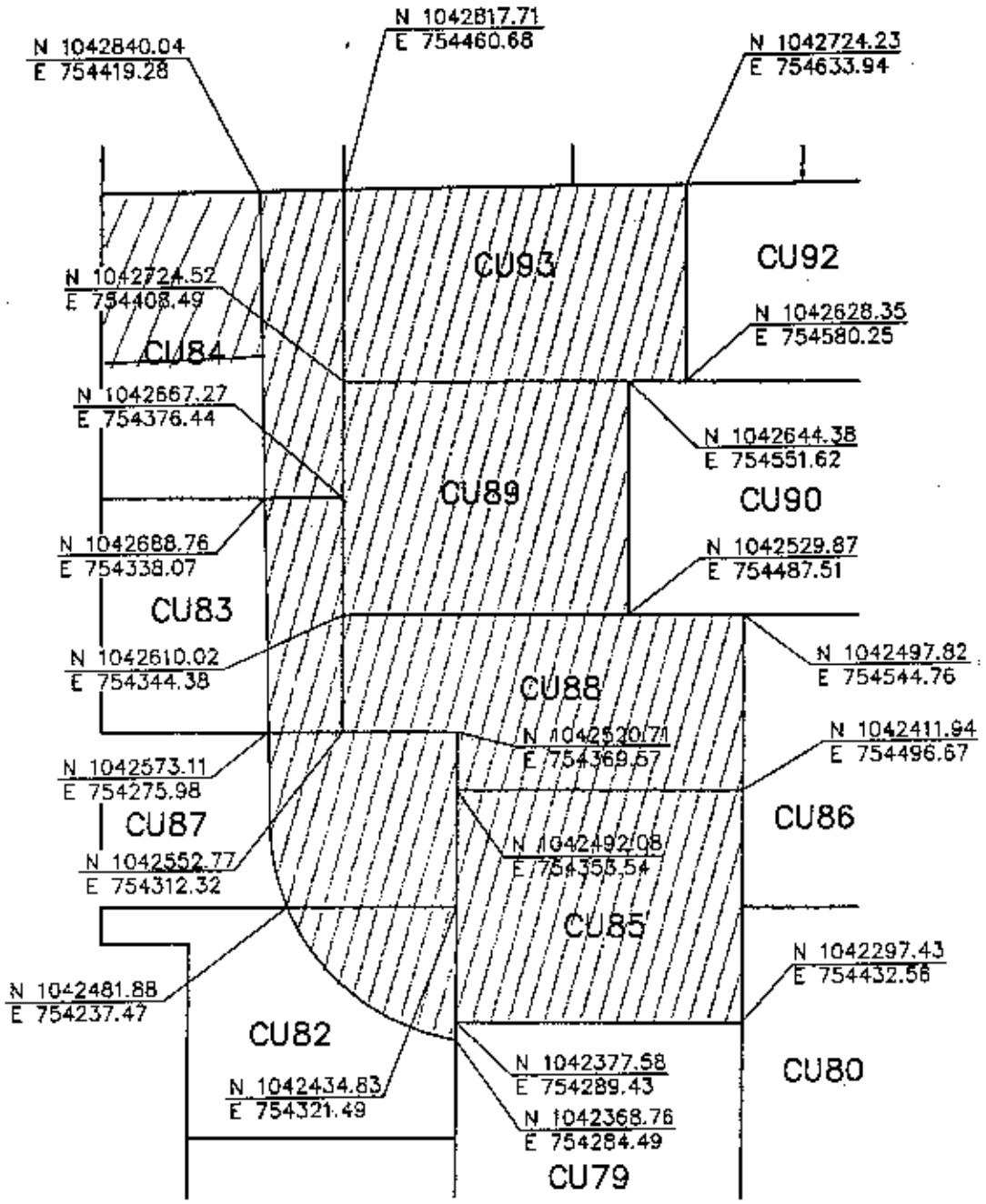
10 5 0 METERS

30 15 0 FEET

Sample Locations in Remedial Unit RU008 Confirmation Unit CU082

Figure B-63

EXHIBIT NO.: A/CP/145/1295		REPORT NO.: DOE/OR/21548-590	
ORIGINATOR: MGL	DRAWN BY: WSSRAP GIS	DATE: 3/96	



Review Form #: 96-062

CONFIRMATION REQUEST – WORK ZONE 3

AVISCO, INC.

WELDON SPRING SITE REMEDIAL ACTION PROJECT
FOUNDATIONS AND CONTAMINATED SOIL REMOVAL

DRAWN BY: D.E.H.	SUBCONTRACT NO.: 35899-SC-WP420	
APPROVED BY: W.P.	FILE NAME: CUZONE3A.DWG	DATE: 04-09-96
SCALE: 1" = 100'	PAY ITEM: N/A	

CU082 DATA REPORT

PARAMETER	CONC	DL	LOCATION	UNITS
URANIUM-238 (8 SAMPLES)				
	2.230	2.420	SC-08719-S	PCI/G
	2.020	4.040	SC-08720-S	PCI/G
	1.520	3.040	SC-08721-S	PCI/G
	2.240	4.480	SC-08206-S	PCI/G
	1.540	3.080	SC-08207-S	PCI/G
	3.660	2.330	SC-08506-S	PCI/G
	2.290	2.720	SC-08511-S	PCI/G
	2.185	4.370	SC-08516-S	PCI/G

URANIUM-238 AVERAGE = 2.211 PCI/G

Weldon Spring Site Remedial Action Project
7295 Highway 94 South, St. Charles, Missouri, 63304

ES&H 1.2.1.1, Rev. 1, 03/96

SOIL CONFIRMATION REMEDIATION DISPOSITION FORM

SECTION I

1. Work Package Number: WP4120 2. Date: 09/17/96 3. Review Form #: 96-063

4. Remediation Unit Number: RU008 5. Confirmation Unit Number: CU083 (map attached)

6. Contaminants of Concern: X U-238 ____ Th-230 ____ Th-232 ____ Ra-226 ____ Ra-228
____ TNT ____ PCB ____ PAH ____ As ____ Cr ____ Pb ____ Tl

7. Results average below ALARA goal(s)?	X Yes ____ No
8. All results below cleanup criteria?	X Yes ____ No
9. Any results greater than 3X criteria?	____ Yes X No
10. Hotspots present (less than 3X criteria)?	____ Yes X No

Parameter	Size	Concentration	Complies with Plan?
			____ Yes ____ No
			____ Yes ____ No
N/A			____ Yes ____ No
			____ Yes ____ No

11. Reviewer: Mel A Lutz Date: 09/17/96

12. Reviewer Disposition Recommendation: X Release for Unrestricted Use (Section II)
____ Additional Excavation Required (Section IV)
____ ALARA Committee Required (Section III)

SECTION II *Results are ALARA. CU is released for unrestricted use.*

14. ES&H Manager: Date: 9/17/96

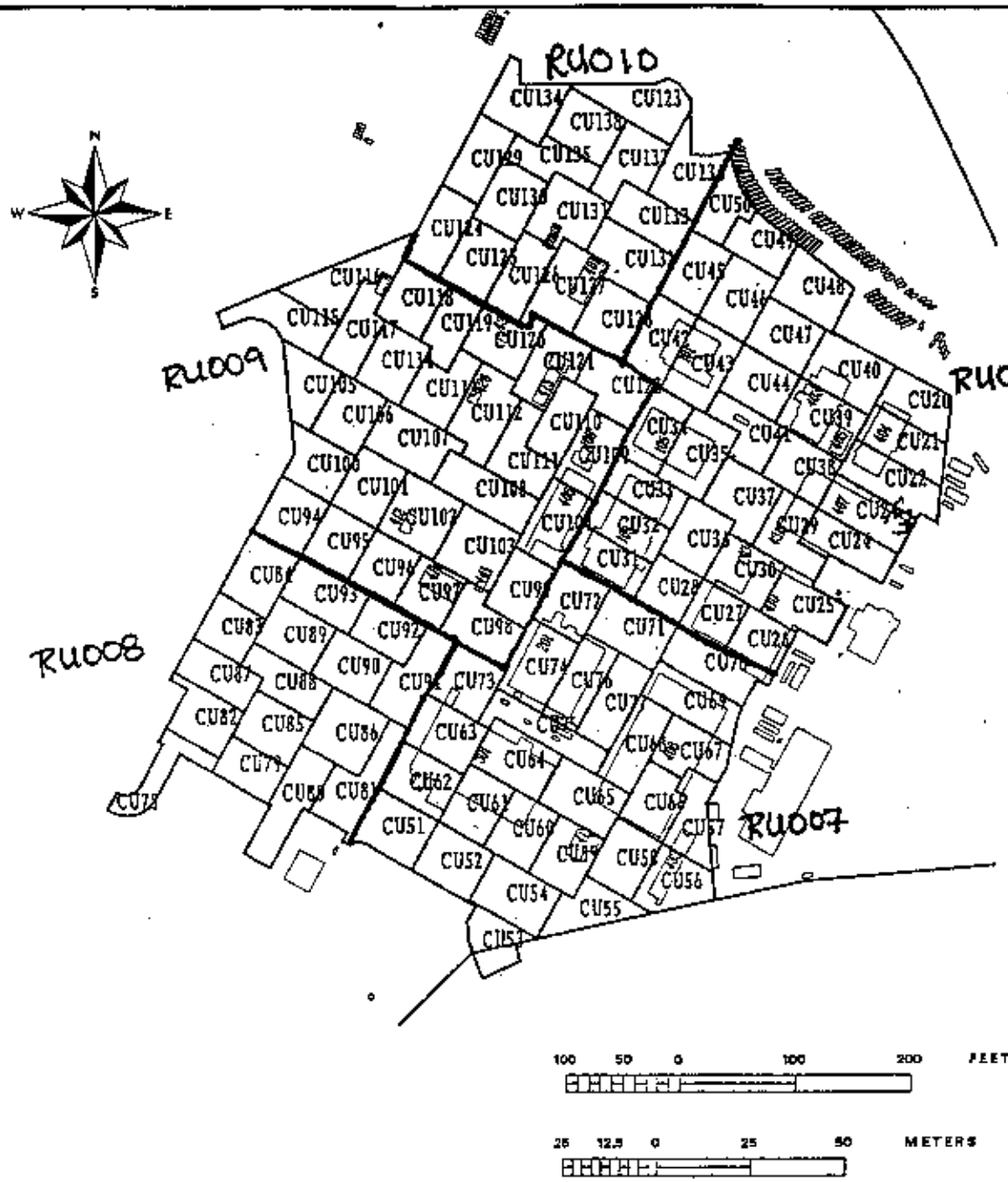
15. DOE Project Manager/Engineer: Date: 9/17/96

16. Project Manager: Date: ~~9/16~~ 9/17/96

17. Construction Engineer: Darrell L. Capps Date: 9/17/96

SEE ATTACHED RESULTS AND MAP

Note: (1) No Utilities.
(2) Please note new boundaries. Remaining portion will be captured under WP437.



LEGEND

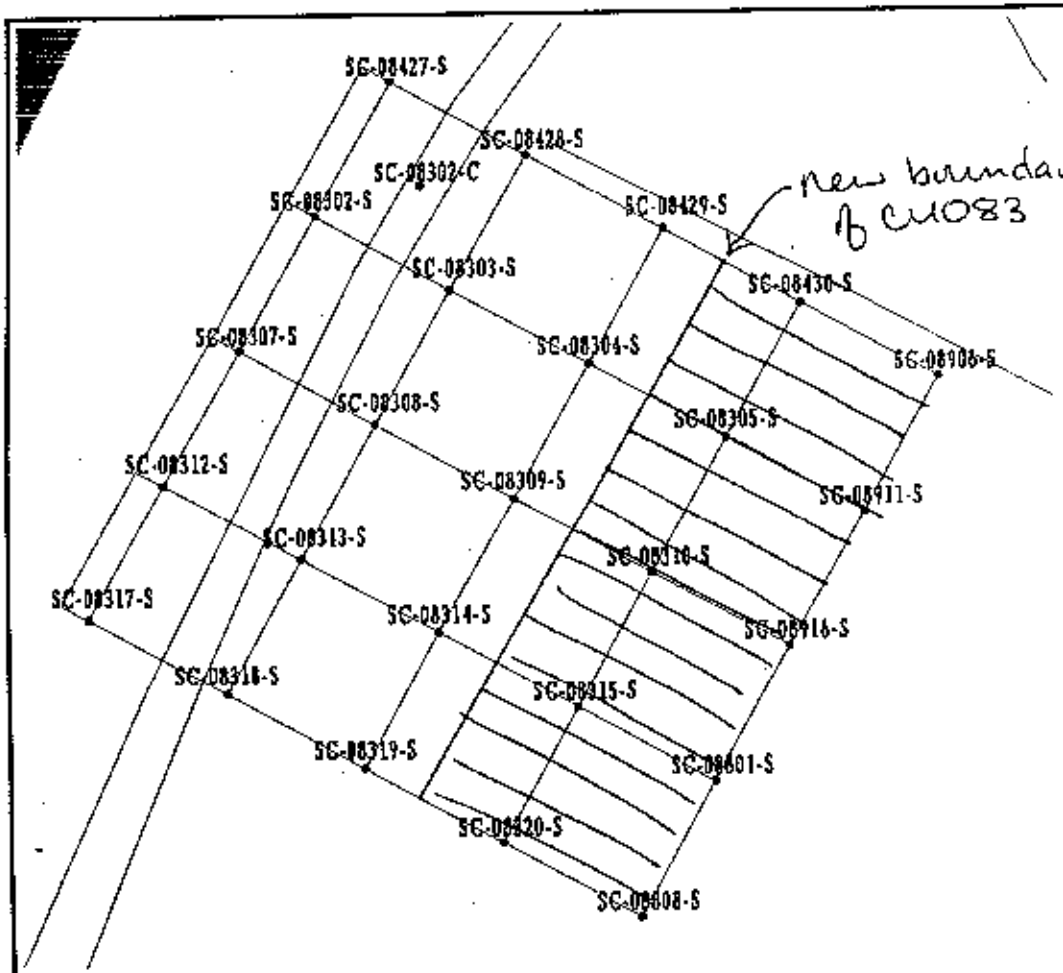
RU006 -- CU020 THRU CU050
RU007 -- CU051 THRU CU077
RU008 -- CU078 THRU CU093
RU009 -- CU094 THRU CU122
RU010 -- CU123 THRU CU138

Review Form# 96-003

Remedial Units for WP-420

Figure: 1-1

REPORT NO.: DOE/OR/21548-590		EXHIBIT NO.: E/CP/006/0196	
ORIGINATOR: EMD	DRAWN BY: WSSRAP GIS	DATE: 01/96	



confirmed portion.

Renew Enu #96-063

See attached sheet for specific coord. of new boundaries.

10 6 0 10 METERS

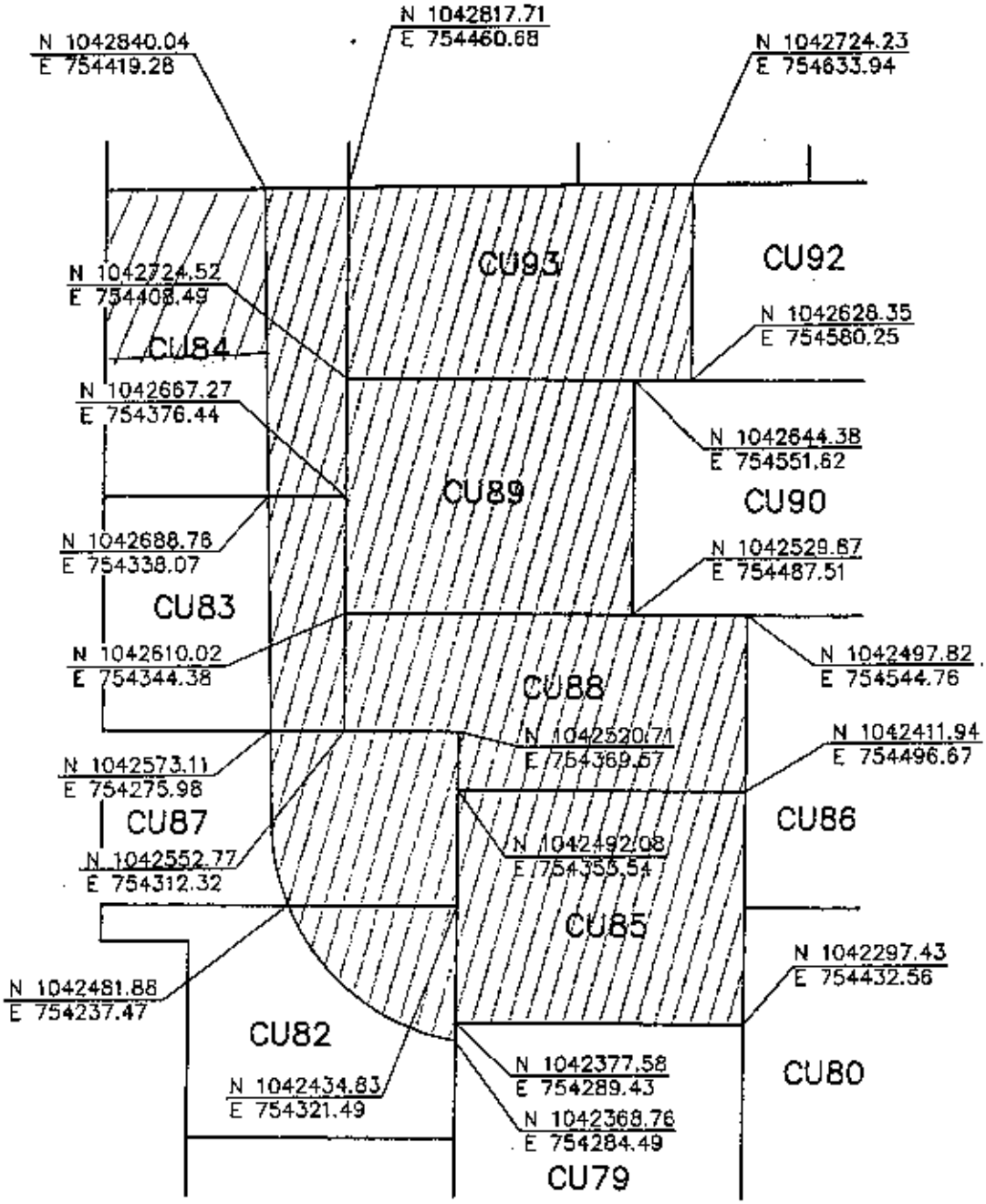
30 15 0 30 FEET

N W E S

Sample Locations in Remedial Unit RU008 Confirmation Unit CU083

Figure B-64

EXHIBIT NO.: A/CP/146/1295		REPORT NO.: DOE/OR/21548-590	
ORIGINATOR: MGL	DRAWN BY: WSSRAP GIS	DATE: 3/96	



Review Form 96-063

CONFIRMATION REQUEST – WORK ZONE 3

AVISCO, INC.

WELDON SPRING SITE REMEDIAL ACTION PROJECT
FOUNDATIONS AND CONTAMINATED SOIL REMOVAL

DRAWN BY: D.E.H.	SUBCONTRACT NO.: 35899-SC-WP420	
APPROVED BY: W.P.	FILE NAME: CUZONE3A.DWG	DATE: 04-09-96
SCALE: 1"=100'	PAY ITEM: N/A	

CU083 DATA REPORT

PARAMETER	CONC	DL	LOCATION	UNITS
URANIUM-238 (10 SAMPLES)				
	4.280	2.670	SC-08305-S	PCI/G
	3.720	2.090	SC-08310-S	PCI/G
	2.265	4.530	SC-08315-S	PCI/G
	5.210	2.690	SC-08320-S	PCI/G
	4.720	2.640	SC-08430-S	PCI/G
	1.755	3.510	SC-08906-S	PCI/G
	3.020	2.810	SC-08911-S	PCI/G
	2.295	4.590	SC-08916-S	PCI/G
	2.025	4.050	SC-08801-S	PCI/G
	1.925	3.850	SC-08808-S	PCI/G

URANIUM-238 AVERAGE = 3.122 PCI/G

Weldon Spring Site Remedial Action Project
7295 Highway 94 South, St. Charles, Missouri, 63304

ES&H 1.2.1.1, Rev. 1, 03/96

SOIL CONFIRMATION REMEDIATION DISPOSITION FORM

SECTION I

1. Work Package Number: WP4Z0 2. Date: 10/09/96 3. Review Form #: 96-075
4. Remediation Unit Number: RU008 5. Confirmation Unit Number: CU84 (map attached)
6. Contaminants of Concern: X U-238 X Th-230 ___ Th-232 ___ Ra-226 ___ Ra-228
   ___ TNT ___ PCB ___ PAH ___ As ___ Cr ___ Pb ___ Tl

7. Results average below ALARA goal(s)?	X Yes ___ No
8. All results below cleanup criteria?	X Yes ___ No
9. Any results greater than 3X criteria?	___ Yes X No
10. Hotspots present (less than 3X criteria)?	___ Yes X No

Parameter	Size	Concentration	Complies with Plan?
			___ Yes ___ No
			___ Yes ___ No
N/A			___ Yes ___ No
			___ Yes ___ No

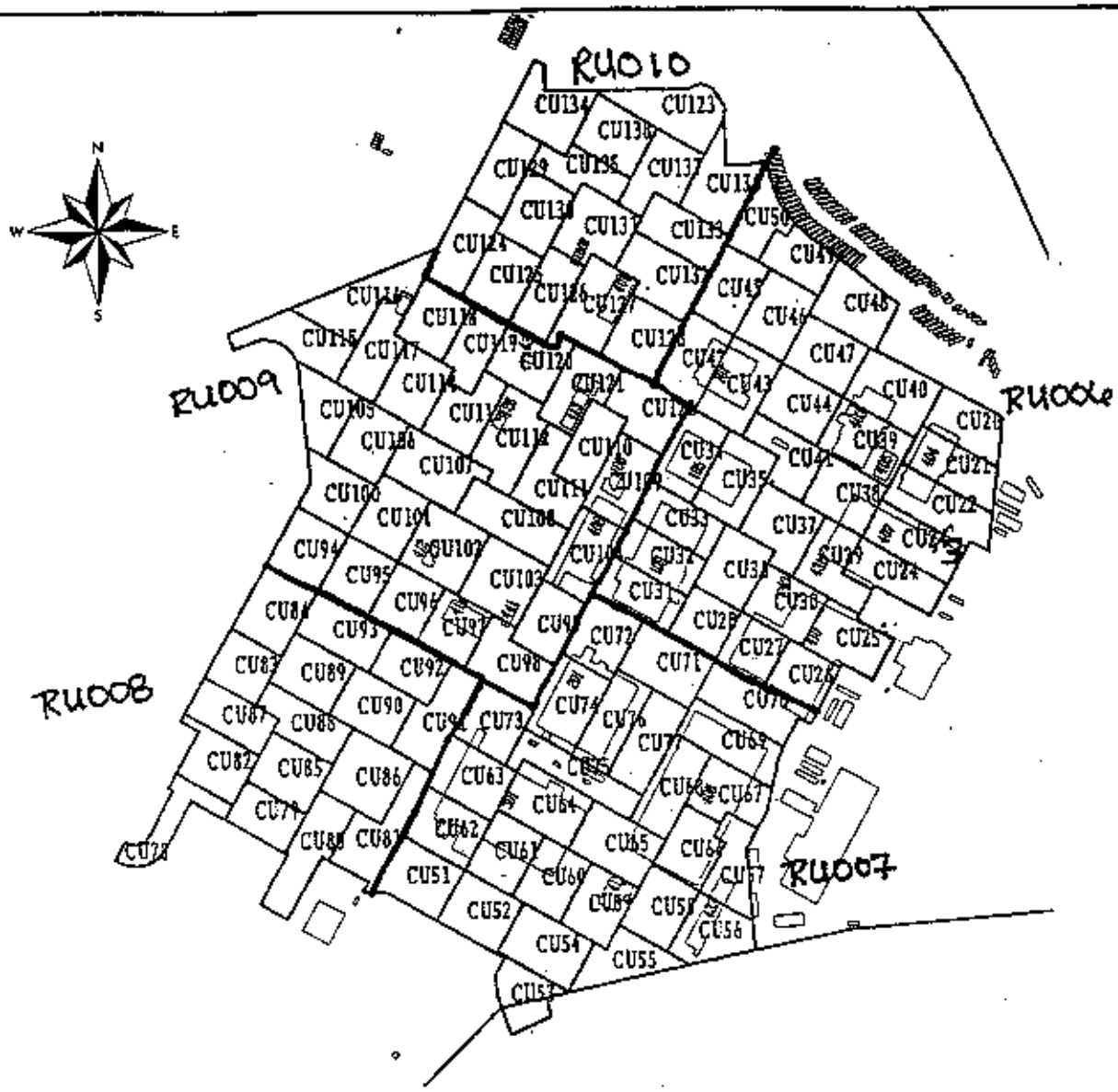
11. Reviewer: Melvin A Lutz Date: 10/09/96

12. Reviewer Disposition Recommendation: X Release for Unrestricted Use (Section II)
    ___ Additional Excavation Required (Section IV)
    ___ ALARA Committee Required (Section III)

SECTION II *Results are ALARA. CU is released for unrestricted use.*

14. ES&H Manager: [signature] Date: 10/9/96
15. DOE Project Manager/Engineer: Thomas C Gauley Date: 10/9/96
16. Project Manager: [signature] Date: 10/9/96
17. Construction Engineer: Daniel L Copper Date: 10/9/96

SEE ATTACHED RESULTS AND MAP



LEGEND

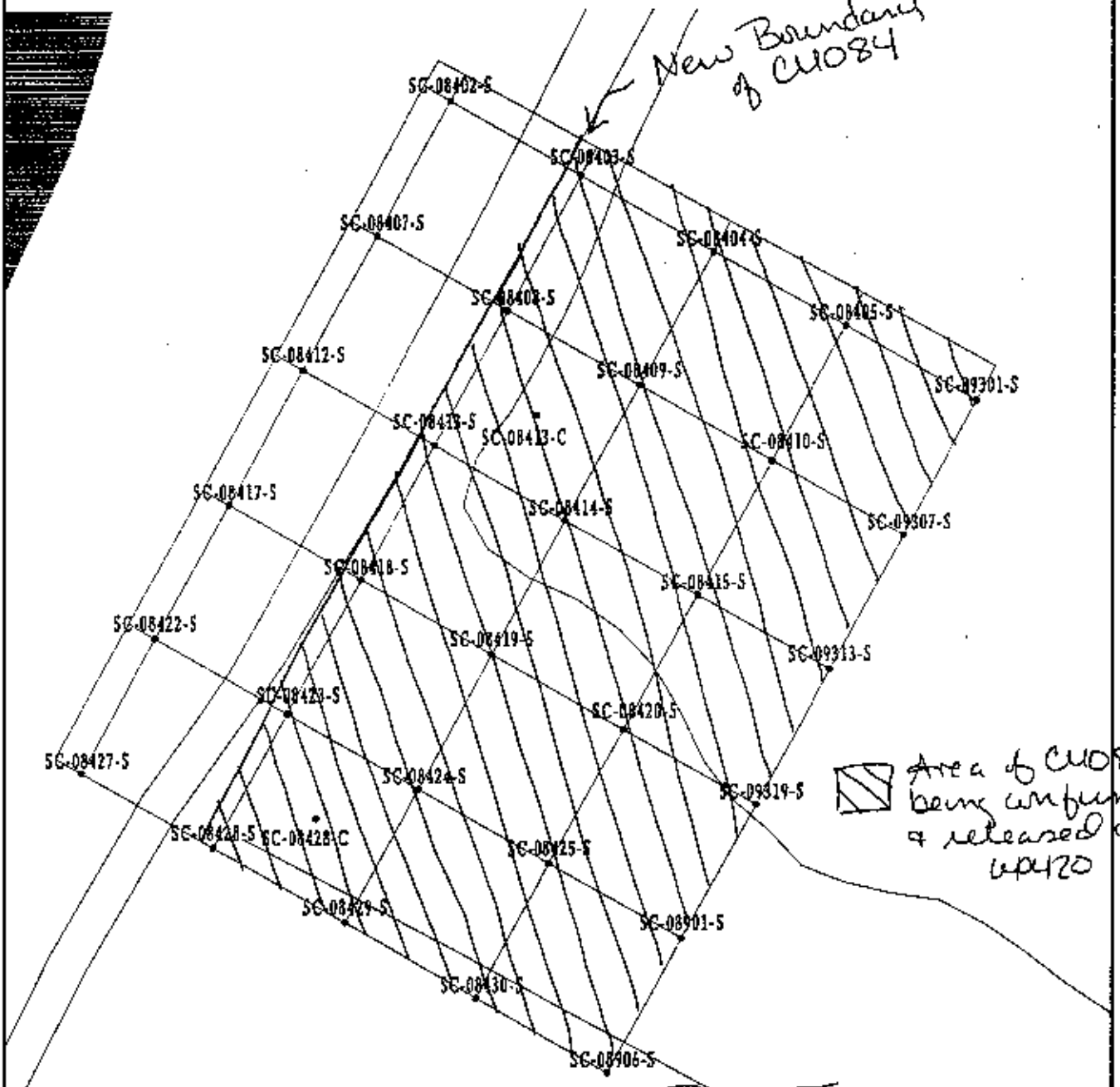
RU006 -- CU020 THRU CU050
RU007 -- CU051 THRU CU077
RU008 -- CU078 THRU CU093
RU009 -- CU094 THRU CU122
RU010 -- CU123 THRU CU138

Review Form# 96-075

Remedial Units for WP-420

Figure: 1-1

REPORT NO.: DOE/OR/21548-590		EXHIBIT NO.: E/CP/006/0196	
ORIGINATOR: EMD	DRAWN BY: WSSRAP GIS	DATE: 01/96	



Review Form # 96-075

N

S

10 5 0 METERS

30 15 0 FEET

Sample Locations in Remedial Unit RU008 Confirmation Unit CU084

Figure B-65

EXHIBIT NO.: A/CP/147/1295		REPORT NO.: DOE/OR/21548-590	
ORIGINATOR: MGL	DRAWN BY: WSSRAP GIS	DATE: 3/96	

CU084 DATA REPORT

URANIUM-238

NUMBER OF URANIUM-238 SAMPLES IN DATABASE FOR THIS CU IS: 25

PARAMETER	LOCATION	CONC	DL	UNITS
URANIUM-238	SC-08403-S	3.330	2.66	PCI/G
URANIUM-238	SC-08404-S	4.280	3.63	PCI/G
URANIUM-238	SC-08408-S	2.265	4.53	PCI/G
URANIUM-238	SC-08405-S	3.720	2.83	PCI/G
URANIUM-238	SC-08409-S	1.705	3.41	PCI/G
URANIUM-238	SC-09301-S	1.605	3.21	PCI/G
URANIUM-238	SC-08413-S	6.070	2.75	PCI/G
URANIUM-238	SC-08410-S	5.690	3.59	PCI/G
URANIUM-238	SC-08414-S	2.910	3.26	PCI/G
URANIUM-238	SC-09307-S	2.145	4.29	PCI/G
URANIUM-238	SC-08418-S	2.440	2.39	PCI/G
URANIUM-238	SC-08415-S	1.670	3.34	PCI/G
URANIUM-238	SC-08419-S	1.665	3.33	PCI/G
URANIUM-238	SC-09313-S	6.210	3.52	PCI/G
URANIUM-238	SC-08423-S	2.470	2.39	PCI/G
URANIUM-238	SC-08420-S	2.190	4.38	PCI/G
URANIUM-238	SC-08424-S	1.915	3.83	PCI/G
URANIUM-238	SC-09319-S	1.710	3.42	PCI/G
URANIUM-238	SC-08428-S	2.005	4.01	PCI/G
URANIUM-238	SC-08425-S	2.330	4.66	PCI/G
URANIUM-238	SC-08429-S	2.070	2.75	PCI/G
URANIUM-238	SC-08901-S	2.135	4.27	PCI/G
URANIUM-238	SC-08430-S	4.720	2.64	PCI/G
URANIUM-238	SC-08906-S	1.755	3.51	PCI/G
URANIUM-238	SC-08413-C	4.430	3.19	PCI/G

Average of URANIUM-238 values is 2.9374 PCI/G, which is below ALARA of 30.0 PCI/G.
Maximum single value is 6.21 PCI/G, which is below criteria of 120.0 PCI/G.

THORIUM-230

NUMBER OF Thorium-230 SAMPLES IN DATABASE FOR THIS CU IS: 10

PARAMETER	LOCATION	CONC	DL	UNITS
Thorium-230	SC-08408-S	2.30	0.72	PCI/G
Thorium-230	SC-08409-S	1.77	0.72	PCI/G
Thorium-230	SC-08413-S	2.06	0.72	PCI/G
Thorium-230	SC-08414-S	2.46	0.72	PCI/G
Thorium-230	SC-08418-S	2.21	0.72	PCI/G
Thorium-230	SC-08419-S	1.48	0.72	PCI/G
Thorium-230	SC-08428-S	2.15	0.72	PCI/G
Thorium-230	SC-08413-C	5.65	0.72	PCI/G
Thorium-230	SC-08423-S	2.27	0.72	PCI/G
Thorium-230	SC-08428-C	1.12	0.72	PCI/G

Average of Thorium-230 values is 2.347 PCI/G, which is below ALARA of 5.0 PCI/G.
Maximum single value is 5.65 PCI/G, which is below criteria of 6.2 PCI/G.

Weldon Spring Site Remedial Action Project
7295 Highway 94 South, St. Charles, Missouri, 63304

ES&H 1.2.1.1, Rev. 1, 03/96

SOIL CONFIRMATION REMEDIATION DISPOSITION FORM

SECTION I

1. Work Package Number: WP420 2. Date: 09-13-96 3. Review Form #: 96-058

4. Remediation Unit Number: RU0078 5. Confirmation Unit Number: CU085 (map attached)

6. Contaminants of Concern: X U-238 ____ Th-230 ____ Th-232 ____ Ra-226 ____ Ra-228
____ TNT ____ PCB ____ PAH ____ As ____ Cr ____ Pb ____ Tl

MGH 9-13-96

7. Results average below ALARA goal(s)?	X Yes ____ No
8. All results below cleanup criteria?	X Yes ____ No
9. Any results greater than 3X criteria?	____ Yes X No
10. Hotspots present (less than 3X criteria)?	____ Yes X No

Parameter	Size	Concentration	Complies with Plan?
N/A			____ Yes ____ No
			____ Yes ____ No
			____ Yes ____ No
			____ Yes ____ No

11. Reviewer: Melvin A Lietz Date: 9/13/96

12. Reviewer Disposition Recommendation:
X Release for Unrestricted Use (Section II)
____ Additional Excavation Required (Section IV)
____ ALARA Committee Required (Section III)

SECTION II *Results are ALARA. CU is released for unrestricted use.*

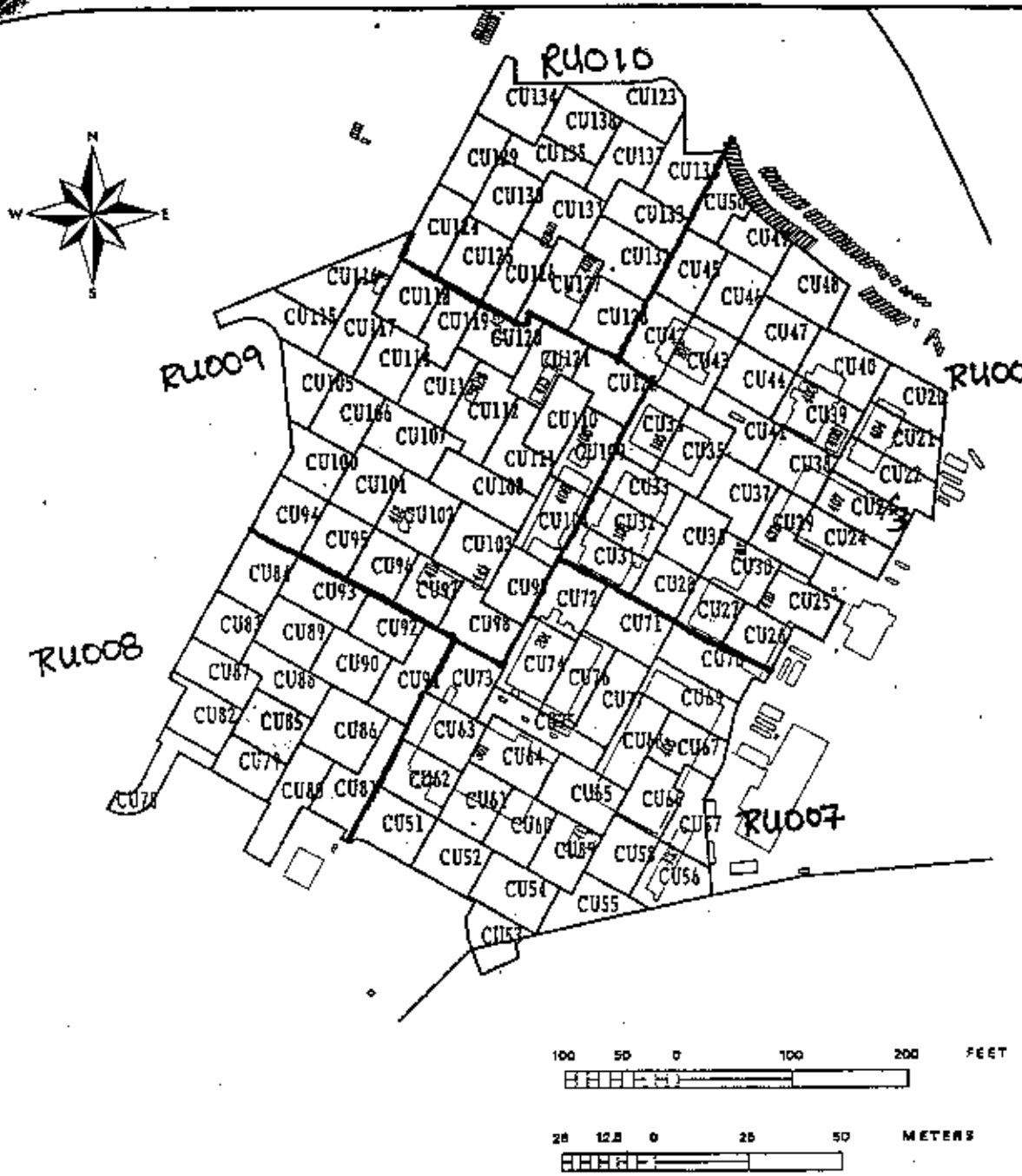
14. ES&H Manager: for KB Date: 9/13/96

15. DOE Project Manager/Engineer: Thomas Carling Date: 9/13/96

16. Project Manager: Date: 9/13/96

17. Construction Engineer: Date: 9/13/96

SEE ATTACHED RESULTS AND MAP



LEGEND

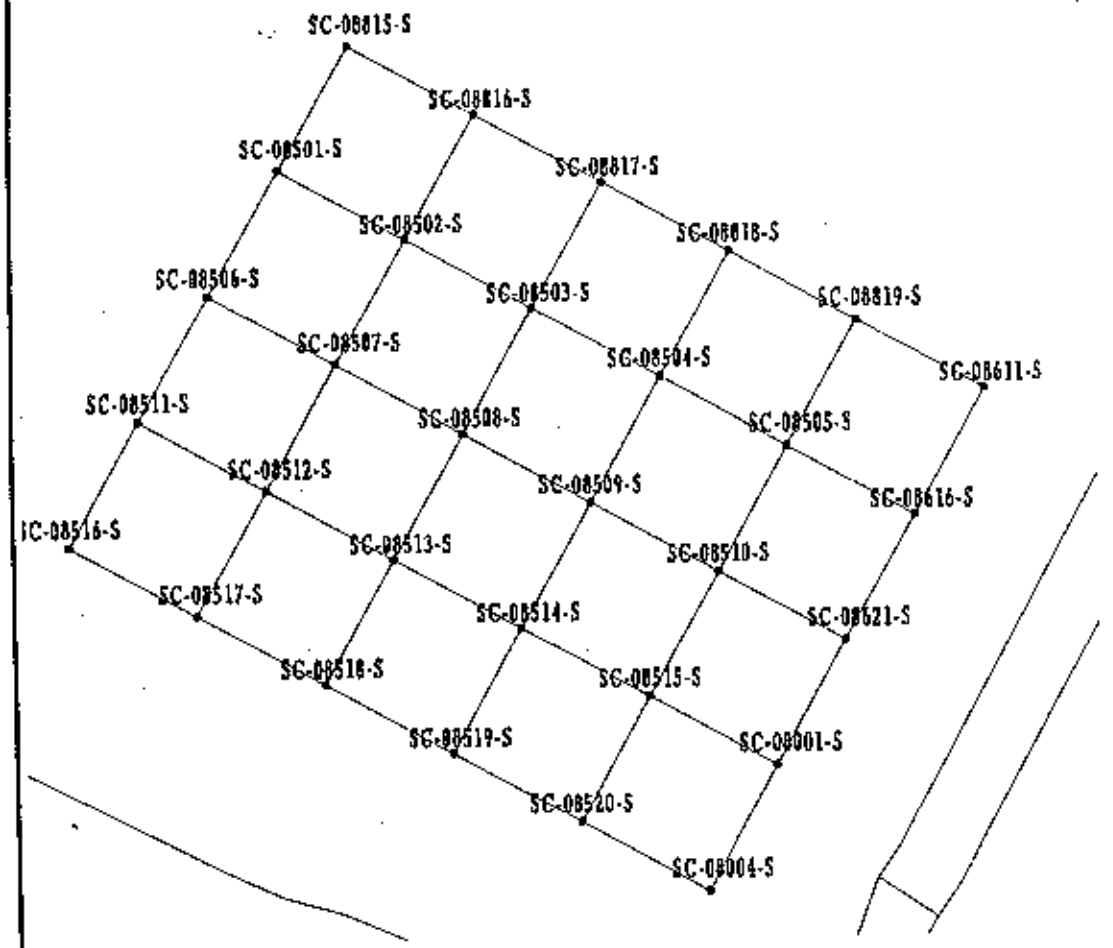
RU006 -- CU020 THRU CU050
RU007 -- CU051 THRU CU077
RU008 -- CU078 THRU CU093
RU009 -- CU094 THRU CU122
RU010 -- CU123 THRU CU138

Review Form#96-058

Remedial Units for WP-420

Figure: 1-1

REPORT NO.: DOE/OR/21548-590	EXHIBIT NO.: E/CP/006/0196	
ORIGINATOR: EMD	DRAWN BY: WSSRAP GIS	DATE: 01/96



10 5 0 10 METERS

30 15 0 30 FEET

N
W E
S

Review Form # 96-058

Sample Locations in Remedial Unit RU008 Confirmation Unit CU085

Figure B-66

EXHIBIT NO.: A/CP/148/1295		REPORT NO.: DOE/OR/21548-590	
ORIGINATOR: MGL	DRAWN BY: WSSRAP GIS	DATE: 3/96	

CU085 DATA REPORT

PARAMETER	CONC	DL	LOCATION	UNITS
URANIUM-238				
	2.235	4.470	SC-08001-S	PCI/G
	2.350	2.610	SC-08004-S	PCI/G
	2.190	3.800	SC-08501-S	PCI/G
	2.850	2.600	SC-08502-S	PCI/G
	4.650	3.100	SC-08503-S	PCI/G
	4.220	2.420	SC-08504-S	PCI/G
	3.470	2.760	SC-08505-S	PCI/G
	3.660	2.330	SC-08506-S	PCI/G
	2.085	4.170	SC-08507-S	PCI/G
	4.100	2.860	SC-08508-S	PCI/G
	2.225	4.450	SC-08509-S	PCI/G
	5.120	2.940	SC-08510-S	PCI/G
	2.290	2.720	SC-08511-S	PCI/G
	2.190	4.380	SC-08512-S	PCI/G
	3.030	2.540	SC-08513-S	PCI/G
	2.040	4.080	SC-08514-S	PCI/G
	3.160	2.960	SC-08515-S	PCI/G
	2.185	4.370	SC-08516-S	PCI/G
	1.655	3.310	SC-08517-S	PCI/G
	2.125	4.250	SC-08518-S	PCI/G
	3.180	2.360	SC-08519-S	PCI/G
	8.320	3.900	SC-08520-S	PCI/G
	3.670	2.610	SC-08611-S	PCI/G
	2.820	3.760	SC-08616-S	PCI/G
	7.450	3.170	SC-08621-S	PCI/G
	2.110	4.220	SC-08815-S	PCI/G
	3.490	3.060	SC-08816-S	PCI/G
	2.135	4.270	SC-08817-S	PCI/G
	2.790	2.920	SC-08818-S	PCI/G
	1.830	2.300	SC-08819-S	PCI/G

URANIUM-238 AVERAGE = 3.188 PCI/G

Weldon Spring Site Remedial Action Project
7295 Highway 94 South, St. Charles, Missouri, 63304

ES&H 1.2.1.1, Rev. 1, 03/96

SOIL CONFIRMATION REMEDIATION DISPOSITION FORM

SECTION I

1. Work Package Number: WP420 2. Date: 10/18/96 3. Review Form #: 96-077a
4. Remediation Unit Number: RU008 5. Confirmation Unit Number: CU086 (map attached)
6. Contaminants of Concern: X U-238 X Th-230 ___ Th-232 X Ra-226 X Ra-228 ___ TNT X PCB ___ PAH X As X Cr X Pb ___ Tl

7. Results average below ALARA goal(s)? PCB Avg = 1.1 mg/Kg	___ Yes X No (see note below)
8. All results below cleanup criteria?	X Yes ___ No
9. Any results greater than 3X criteria?	___ Yes X No
10. Hotspots present (less than 3X criteria)?	___ Yes X No

Parameter	Size	Concentration	Complies with Plan?
			___ Yes ___ No
			___ Yes ___ No
			___ Yes ___ No
			___ Yes ___ No

11. Reviewer: [signature] Date: 10/18/96

12. Reviewer Disposition Recommendation:
X Release for Unrestricted Use (Section II)
___ Additional Excavation Required (Section IV)
___ ALARA Committee Required (Section III)

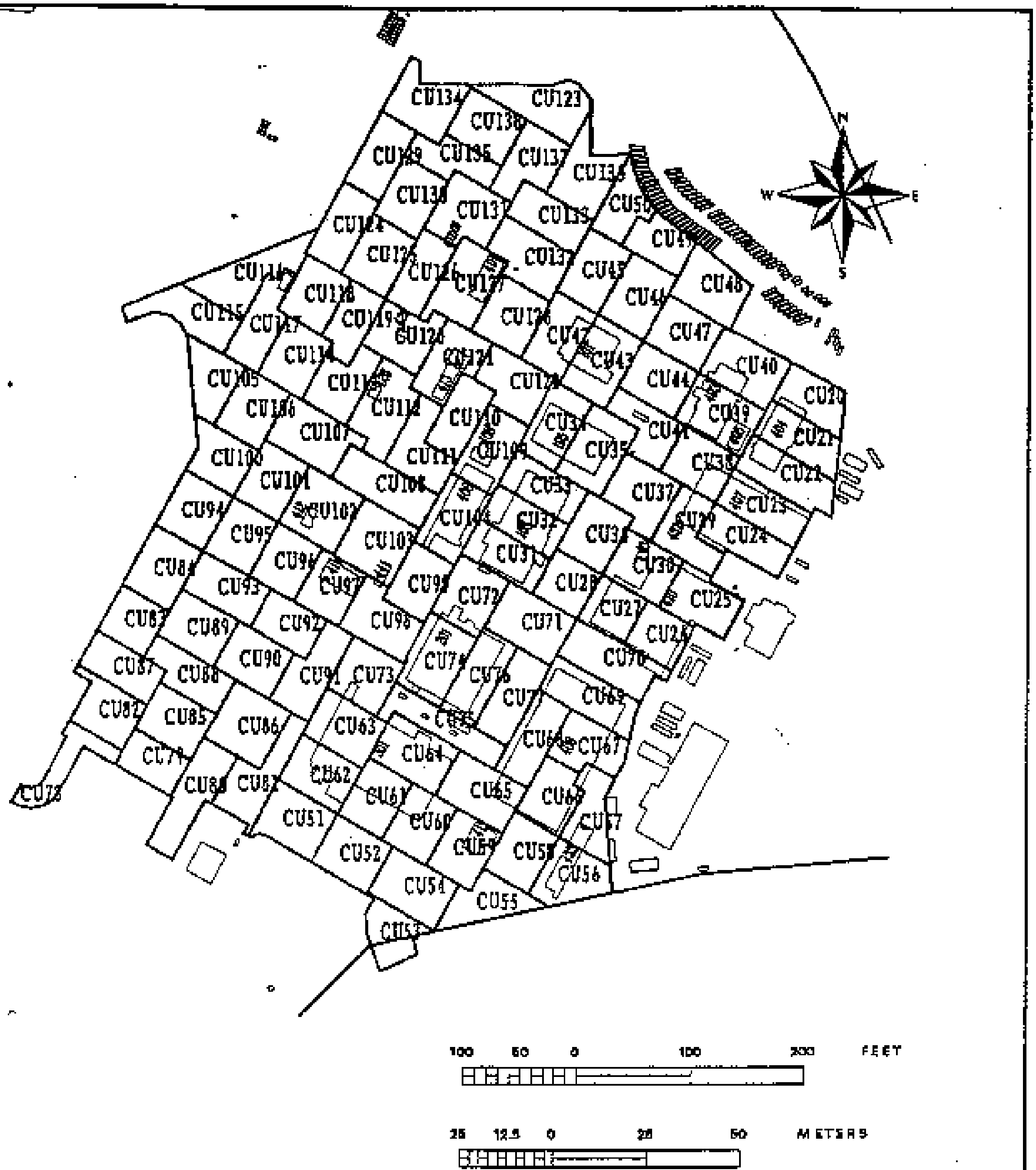
SECTION II *Results are ALARA. CU is released for unrestricted use.*

14. ES&H Manager: [signature] for KSM Date: 10/18/96
15. DOE Project Manager/Engineer: Thomas C. Pauling * Date: 10/18/96
16. Project Manager: [signature] Date: 10/18/96
17. Construction Engineer: Darrell L. Cagne Date: 10-18-96

SEE ATTACHED RESULTS AND MAP

Note: The ALARA committee passed this CU with the PCB avg. > ALARA (see 96-077 disposition form). MAL 10/18/96

* signature acknowledges removal of uranium hotspot only



LEGEND

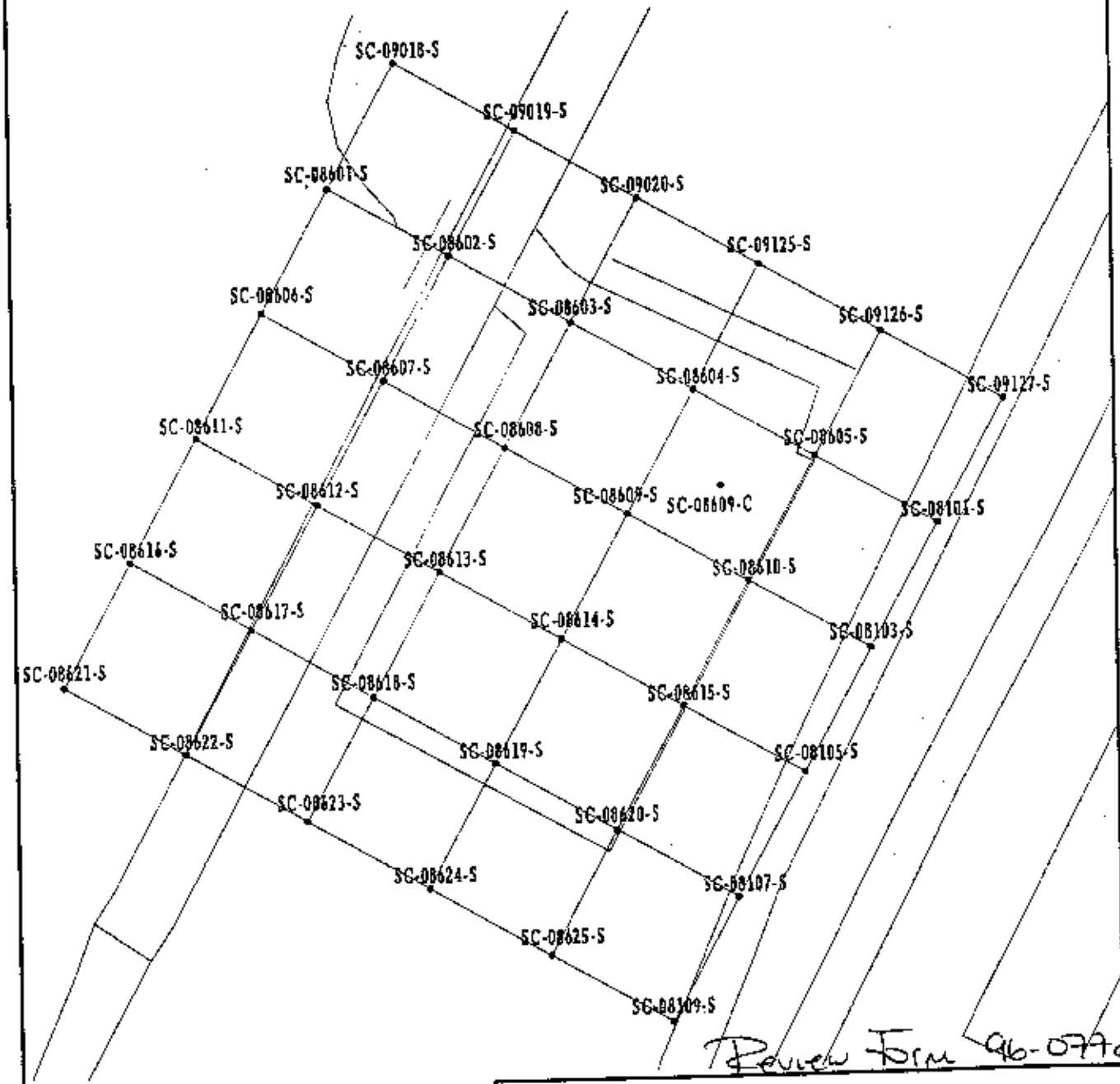
RU006 -- CU020 THRU CU050
RU007 -- CU051 THRU CU077
RU008 -- CU078 THRU CU093
RU009 -- CU094 THRU CU122
RU010 -- CU123 THRU CU138

Review Form # 96-077a

Remedial Units for WP-420

Figure: 1-1

REPORT NO.: DOE/OR/21548-590		EXHIBIT NO.: E/CP/006/0196	
ORIGINATOR: EMD	DRAWN BY: WSSRAP	DATE: 01/96	



Review Form 96-077a

Sample Locations in Remedial Unit RU008 Confirmation Unit CU086

Figure B-67

EXHIBIT NO.: A/CP/149/1295		REPORT NO.: DOE/OR/21548-590	
ORIGINATOR: MGL	DRAWN BY: WSSRAP GIS	DATE: 3/96	

10/18/96

CU086 DATA REPORT

URANIUM-238

NUMBER OF URANIUM-238 SAMPLES IN DATABASE FOR THIS CU IS: 36

PARAMETER	LOCATION	CONC	DL	UNITS
URANIUM-238	SC-09018-S	4.280	2.35	PCI/G
URANIUM-238	SC-09019-S	2.215	4.43	PCI/G
URANIUM-238	SC-08601-S	2.590	4.18	PCI/G
URANIUM-238	SC-09020-S	1.685	3.37	PCI/G
URANIUM-238	SC-08602-S	1.545	3.09	PCI/G
URANIUM-238	SC-09125-S	10.420	2.18	PCI/G
URANIUM-238	SC-08606-S	2.235	4.47	PCI/G
URANIUM-238	SC-08603-S	2.055	4.11	PCI/G
URANIUM-238	SC-09126-S	13.46	4.18	PCI/G
URANIUM-238	SC-08607-S	4.160	2.96	PCI/G
URANIUM-238	SC-08604-S	22.190	4.06	PCI/G
URANIUM-238	SC-09127-S	23.070	3.33	PCI/G
URANIUM-238	SC-08611-S	3.670	2.61	PCI/G
URANIUM-238	SC-08608-S	3.000	3.13	PCI/G
URANIUM-238	SC-08605-S	14.740	4.59	PCI/G
URANIUM-238	SC-08612-S	4.250	3.02	PCI/G
URANIUM-238	SC-08609-S	15.400	2.26	PCI/G
URANIUM-238	SC-08101-S	16.180	4.54	PCI/G
URANIUM-238	SC-08616-S	2.820	3.76	PCI/G
URANIUM-238	SC-08613-S	11.400	3.11	PCI/G
URANIUM-238	SC-08610-S	16.610	5.07	PCI/G
URANIUM-238	SC-08617-S	1.625	3.25	PCI/G
URANIUM-238	SC-08614-S	12.790	3.81	PCI/G
URANIUM-238	SC-08103-S	6.390	3.53	PCI/G
URANIUM-238	SC-08621-S	7.450	3.17	PCI/G
URANIUM-238	SC-08618-S	4.260	3.98	PCI/G
URANIUM-238	SC-08615-S	4.430	4.08	PCI/G
URANIUM-238	SC-08622-S	1.975	3.95	PCI/G
URANIUM-238	SC-08619-S	10.090	3.20	PCI/G
URANIUM-238	SC-08105-S-RS	9.640	3.72	PCI/G
URANIUM-238	SC-08623-S	5.660	2.87	PCI/G
URANIUM-238	SC-08620-S	7.710	3.15	PCI/G
URANIUM-238	SC-08624-S	15.830	3.41	PCI/G
URANIUM-238	SC-08107-S	10.320	3.64	PCI/G
URANIUM-238	SC-08625-S	17.650	4.79	PCI/G
URANIUM-238	SC-08109-S	4.970	9.94	PCI/G

URANIUM-238 average value is 8.299 PCI/G, which is below ALARA value of 30.0 PCI/G.
The maximum single concentration value is 23.07 PCI/G, which is below Criteria of 120 PCI/G.

THORIUM-230

NUMBER OF Thorium-230 SAMPLES IN DATABASE FOR THIS CU IS: 6

PARAMETER	LOCATION	CONC	DL	UNITS
Thorium-230	SC-09020-S	1.01	0.72	PCI/G
Thorium-230	SC-08603-S	0.91	0.72	PCI/G
Thorium-230	SC-08608-S	1.16	0.72	PCI/G
Thorium-230	SC-08613-S	1.04	0.72	PCI/G
Thorium-230	SC-08618-S	0.91	0.72	PCI/G
Thorium-230	SC-08623-S	1.39	0.72	PCI/G

Average of Thorium-230 values is 1.07 PCI/G, which is below ALARA, 5.0 PCI/G.
Maximum single value is 1.39 PCI/G, which is below criteria, 6.2 PCI/G.

CU086 DATA REPORT (CONTINUED)

RADIUM-226

NUMBER OF RADIUM-226 SAMPLES IN DATABASE FOR THIS CU IS: 6

PARAMETER	LOCATION	CONC	DL	UNITS
RADIUM-226	SC-09020-S	2.3608	0.29	PCI/G
RADIUM-226	SC-08603-S	2.3154	0.38	PCI/G
RADIUM-226	SC-08608-S	2.4062	0.27	PCI/G
RADIUM-226	SC-08613-S	2.4970	0.34	PCI/G
RADIUM-226	SC-08618-S	2.4743	0.43	PCI/G
RADIUM-226	SC-08623-S	2.4743	0.29	PCI/G

Average of RADIUM-226 values is 2.421 PCI/G, which is below ALARA, 5.0 PCI/G.
Maximum single value is 2.497 PCI/G, which is below criteria, 6.2 PCI/G.

RADIUM-228

NUMBER OF RADIUM-228 SAMPLES IN DATABASE FOR THIS CU IS: 6

PARAMETER	LOCATION	CONC	DL	UNITS
RADIUM-228	SC-09020-S	1.41	0.44	PCI/G
RADIUM-228	SC-08603-S	1.25	0.35	PCI/G
RADIUM-228	SC-08608-S	1.33	0.51	PCI/G
RADIUM-228	SC-08613-S	1.16	0.40	PCI/G
RADIUM-228	SC-08618-S	1.03	0.60	PCI/G
RADIUM-228	SC-08623-S	1.39	0.38	PCI/G

Average of RADIUM-228 values is 1.26 PCI/G, which is below ALARA, 5.0 PCI/G.
Maximum single value is 1.41 PCI/G, which is below criteria, 6.2 PCI/G.

ARSENIC

NUMBER OF Arsenic SAMPLES IN DATABASE FOR THIS CU IS: 6

PARAMETER	LOCATION	CONC	DL	UNITS
Arsenic	SC-09020-S	9.8	0.43	UG/G
Arsenic	SC-08603-S	5.9	0.42	UG/G
Arsenic	SC-08608-S	5.4	0.43	UG/G
Arsenic	SC-08613-S	7.3	0.42	UG/G
Arsenic	SC-08618-S	6.1	0.43	UG/G
Arsenic	SC-08623-S	34.1	0.45	UG/G

Average of Arsenic values is 11.433 UG/G, which is below ALARA, 45.0 UG/G.
Maximum single value is 34.1 UG/G, which is below criteria, 75 UG/G.

CHROMIUM

NUMBER OF Chromium SAMPLES IN DATABASE FOR THIS CU IS: 6

PARAMETER	LOCATION	CONC	DL	UNITS
Chromium	SC-09020-S	17.2	0.36	UG/G
Chromium	SC-08603-S	13.2	0.35	UG/G
Chromium	SC-08608-S	14.6	0.36	UG/G
Chromium	SC-08613-S	14.5	0.35	UG/G
Chromium	SC-08618-S	12.4	0.36	UG/G
Chromium	SC-08623-S	16.7	0.38	UG/G

Average of Chromium values is 14.77 UG/G, which is below ALARA, 90.0 UG/G.
Maximum single value is 17.2 UG/G, which is below criteria, 110.0 UG/G.

CU086 DATA REPORT (CONTINUED)

LEAD

NUMBER OF Lead SAMPLES IN DATABASE FOR THIS CU IS: 6

PARAMETER	LOCATION	CONC	DL	UNITS
Lead	SC-09020-S	20.5	0.19	UG/G
Lead	SC-08603-S	10.9	0.19	UG/G
Lead	SC-08608-S	12.1	0.19	UG/G
Lead	SC-08613-S	14.8	0.19	UG/G
Lead	SC-08618-S	10.6	0.19	UG/G
Lead	SC-08623-S	18.5	0.20	UG/G

Average of Lead values is 14.57 UG/G, which is below ALARA, 240.0 UG/G.
Maximum single value is 20.5 UG/G, which is below criteria, 450 UG/G.

PCBs

NUMBER OF PCB SAMPLES IN DATABASE FOR THIS CU IS: 11

PARAMETER	LOCATION	CONC	DL	UNITS
PCB	SC-09020-S	0	40	UG/KG
PCB	SC-08603-S	0	39	UG/KG
PCB	SC-08604-S	1700	75	UG/KG
PCB	SC-08608-S	0	40	UG/KG
PCB	SC-08605-S	5800	390	UG/KG
PCB	SC-08609-S	740	38	UG/KG
PCB	SC-08613-S	180	38	UG/KG
PCB	SC-08610-S	1400	72	UG/KG
PCB	SC-08618-S	0	39	UG/KG
PCB	SC-08623-S	276	42	UG/KG
PCB	SC-08609-C	1600	77	UG/KG

The Average PCB value is 1063.27 UG/KG, which is ABOVE_ALARA. The Surface ALARA value is 650 UG/KG.
The maximum single concentration value is 5800 UG/KG, which does not exceed Criteria.

Weldon Spring Site Remedial Action Project
7295 Highway 94 South, St. Charles, Missouri, 63304

SOIL CONFIRMATION REMEDIATION DISPOSITION FORM

SECTION I

1. Work Package Number: WP420 2. Date: 10/16/96 3. Review Form #: 96-077

4. Remediation Unit Number: RU008 5. Confirmation Unit Number: CU0816 (map attached)

6. Contaminants of Concern: X U-238 X Th-230 ___ Th-232 X Ra-226 X Ra-228
___ TNT X PCB ___ PAH X As X Cr X Pb ___ Tl

7. Results average below ALARA goal(s)? PCB Avg = 1.1 mg/Kg *	___ Yes X No
8. All results below cleanup criteria?	___ Yes X No
9. Any results greater than 3X criteria?	___ Yes X No
10. Hotspots present (less than 3X criteria)?	X Yes ___ No

Parameter	Size	Concentration	Complies with Plan?
U-238 (SC-08105-S)	~1 ft x 1 ft	191.29 pCi/g	X* Yes ___ No
			___ Yes ___ No
			___ Yes ___ No
			___ Yes ___ No

11. Reviewer: Melissa M. Leitz Date: 10/16/96

12. Reviewer Disposition Recommendation: ___ Release for Unrestricted Use (Section II)
___ Additional Excavation Required (Section IV)
X ALARA Committee Required (Section III)

SECTION II *Results are ALARA. CU is released for unrestricted use.*

14. ES&H Manager: _____ Date: _____

15. DOE Project Manager/Engineer: _____ Date: _____

16. Project Manager: _____ Date: _____

17. Construction Engineer: _____ Date: _____

SEE ATTACHED RESULTS AND MAP

* See ALARA Committee Decisions regarding PCBs & U-238.

SOIL CONFIRMATION REMEDIATION DISPOSITION FORM

ES&H-1.2.1. 03/96

SECTION III — *ALARA Committee (Average above ALARA)*

Confirmation unit status reports have been attached for the following contaminants of concern for which the average exceeds ALARA:

____ U-238	____ Th-230	____ Th-232	____ Ra-226	____ RA-228	____ TNT	
____ PAH	____ As	____ Cr	____ Pb	____ Tl	____ PCB	

Disposition Input: ① PCB's - avg. exceeded ALARA, but was less than criteria. To date, more than 50% of the PCB results have been less than ALARA ∴ no further excavation for the PCB's is required. Note: The field replicate for SC-08610-S was 10 mg/kg. If this value was used in place of the parent sample, the avg. would still be less than criteria. The extent is also assumed small since that parent sample value was 1.4 mg/kg & obtained from the same location ∴ this area would meet the hotspot criteria. ② Uranium-238 - see attached sheet.

Disposition Decision:

____ Backfill/Release for Unrestricted Use.
__X__ Additional Excavation Required. (for the U-238 only)
____ Additional Samples to be Collected.

Y — Vote — ES&H Manager — 10/16/96 — Date

N — Vote — DOE Project Manager/Engineer — Thomas C. Darling — (recommend that since additional excavation is necessary for uranium, elevated PCB soils should also be removed) — 10/16/96 — Date

Y — Vote — Deputy Project Director - Operations — 10-16-96 — Date

Y — Vote — Environmental Protection Manager — 10/16/96 — Date

Y — Vote — Deputy Project Director - Environmental — 10/16/96 — Date

Construction Engineer — 10/16/96 — Date

Project Manager — 10/16/96 — Date

Section IV *Results greater than 3X criteria or > hotspot rule, additional excavation automatically required.*

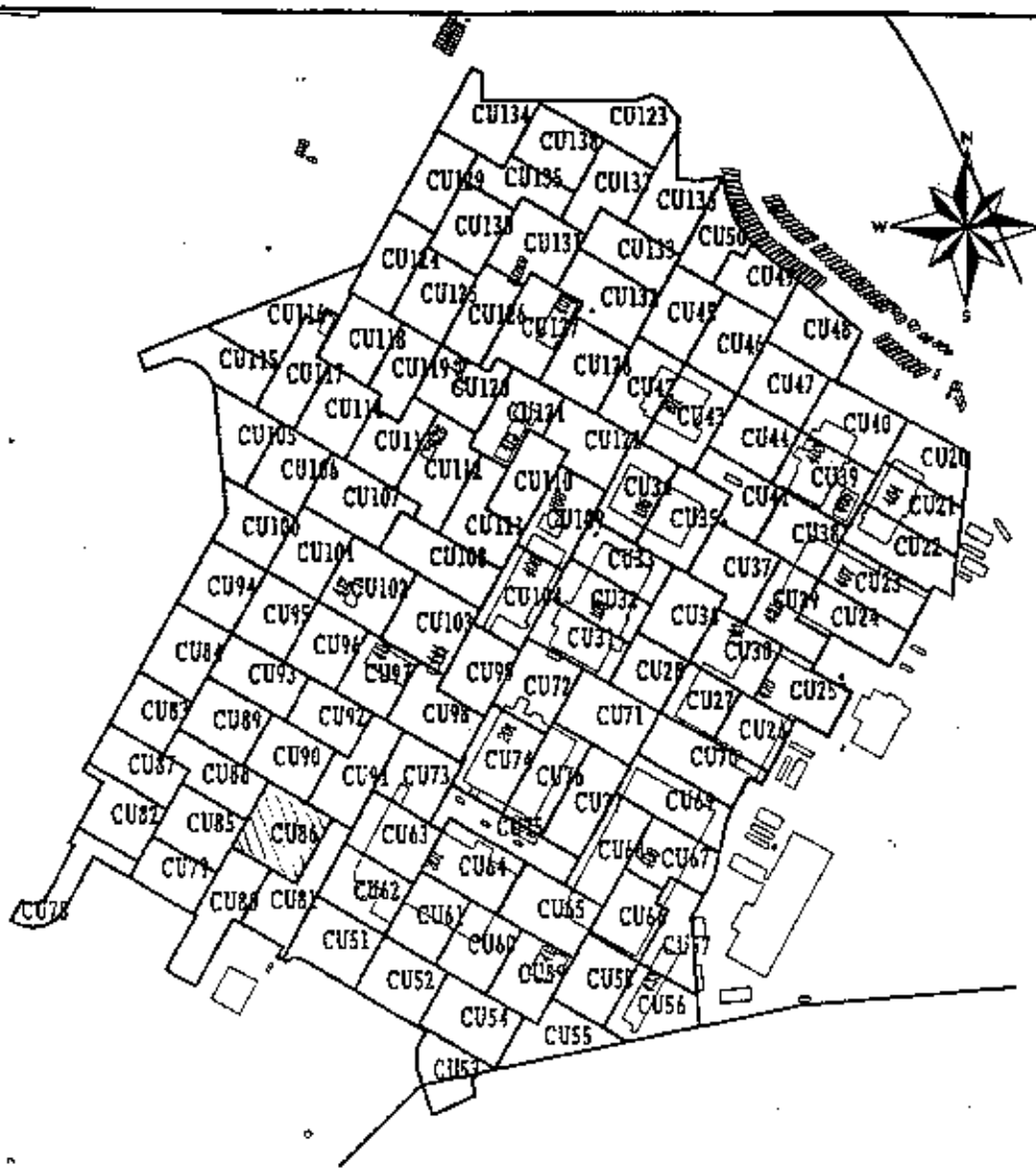
Project Manager: _____ Date: _____

Construction Engineer: _____ Date: _____

SECTION III ALARA Committee, continued

Disposition Input, continued:

@U-238: Although the result for SC-08105-S meets the hotspot rule, the QC sample (SC-08105-S-SD) value = 410pCi/g. This value exceeds the 3x criteria rule and therefore no longer meets the hotspot rule. This area will be excavated 1 foot, re-walked over, & resampled.



LEGEND

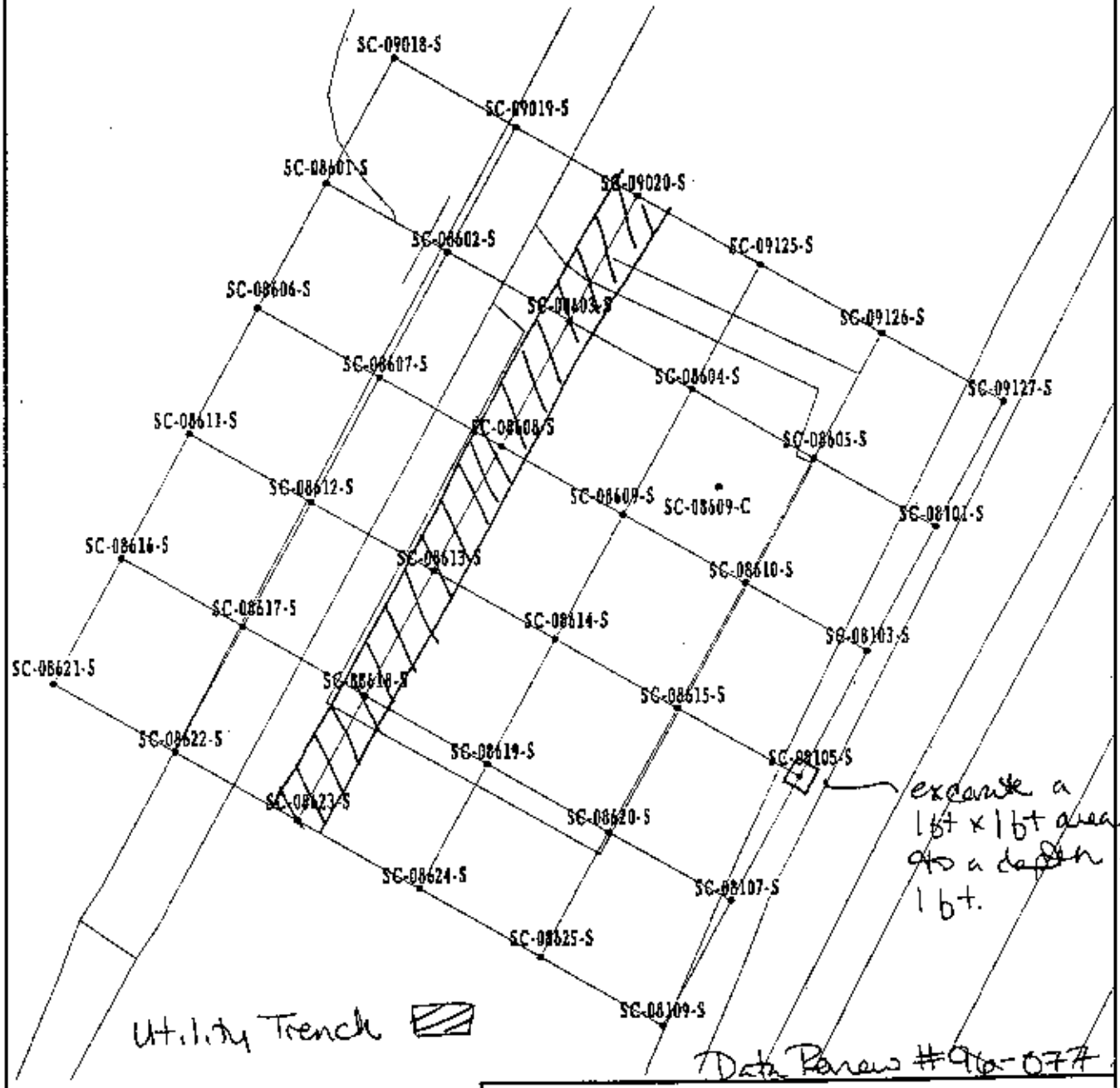
RU006 -- CU020 THRU CU050
RU007 -- CU051 THRU CU077
RU008 -- CU078 THRU CU093
RU009 -- CU094 THRU CU122
RU010 -- CU123 THRU CU138

Review Form # 96-077

Remedial Units for WP-420

Figure: 1-1

REPORT NO.: DOE/OR/21548-590	EXHIBIT NO.: E/CP/006/0196	
ORIGINATOR: EMD	DRAWN BY: WSSRAP	DATE: 01/96



Sample Locations in Remedial Unit RU008 Confirmation Unit CU086

Figure B-67

EXHIBIT NO.: A/CP/149/1295		REPORT NO.: DOE/OR/21548-590	
ORIGINATOR: MGL	DRAWN BY: WSSRAP GIS	DATE: 3/96	

CU086 DATA REPORT

URANIUM-238

NUMBER OF URANIUM-238 SAMPLES IN DATABASE FOR THIS CU IS: 36

PARAMETER	LOCATION	CONC	DL	UNITS
URANIUM-238	SC-09018-S	4.280	2.35	PCI/G
URANIUM-238	SC-09019-S	2.215	4.43	PCI/G
URANIUM-238	SC-08601-S	2.590	4.18	PCI/G
URANIUM-238	SC-09020-S	1.685	3.37	PCI/G
URANIUM-238	SC-08602-S	1.545	3.09	PCI/G
URANIUM-238	SC-09125-S	10.420	2.18	PCI/G
URANIUM-238	SC-08606-S	2.235	4.47	PCI/G
URANIUM-238	SC-08603-S	2.055	4.11	PCI/G
URANIUM-238	SC-09126-S	13.46	4.18	PCI/G
URANIUM-238	SC-08607-S	4.160	2.96	PCI/G
URANIUM-238	SC-08604-S	22.190	4.06	PCI/G
URANIUM-238	SC-09127-S	23.070	3.33	PCI/G
URANIUM-238	SC-08611-S	3.670	2.61	PCI/G
URANIUM-238	SC-08608-S	3.000	3.13	PCI/G
URANIUM-238	SC-08605-S	14.740	4.59	PCI/G
URANIUM-238	SC-08612-S	4.250	3.02	PCI/G
URANIUM-238	SC-08609-S	15.400	2.26	PCI/G
URANIUM-238	SC-08101-S	16.180	4.54	PCI/G
URANIUM-238	SC-08616-S	2.820	3.76	PCI/G
URANIUM-238	SC-08613-S	11.400	3.11	PCI/G
URANIUM-238	SC-08610-S	16.610	5.07	PCI/G
URANIUM-238	SC-08617-S	1.625	3.25	PCI/G
URANIUM-238	SC-08614-S	12.790	3.81	PCI/G
URANIUM-238	SC-08103-S	6.390	3.53	PCI/G
URANIUM-238	SC-08621-S	7.450	3.17	PCI/G
URANIUM-238	SC-08618-S	4.260	3.98	PCI/G
URANIUM-238	SC-08615-S	4.430	4.08	PCI/G
URANIUM-238	SC-08622-S	1.975	3.95	PCI/G
URANIUM-238	SC-08619-S	10.090	3.20	PCI/G
URANIUM-238	SC-08105-S	191.290	11.56	PCI/G
URANIUM-238	SC-08623-S	5.660	2.87	PCI/G
URANIUM-238	SC-08620-S	7.710	3.15	PCI/G
URANIUM-238	SC-08624-S	15.830	3.41	PCI/G
URANIUM-238	SC-08107-S	10.320	3.64	PCI/G
URANIUM-238	SC-08625-S	17.650	4.79	PCI/G
URANIUM-238	SC-08109-S	4.970	9.94	PCI/G

URANIUM-238 average value is 13.345 PCI/G, which is below ALARA value of 30.0 PCI/G.
The maximum single concentration value is 191.29 PCI/G, which exceeds Criteria.

THORIUM-230

NUMBER OF Thorium-230 SAMPLES IN DATABASE FOR THIS CU IS: 6

PARAMETER	LOCATION	CONC	DL	UNITS
Thorium-230	SC-09020-S	1.01	0.72	PCI/G
Thorium-230	SC-08603-S	0.91	0.72	PCI/G
Thorium-230	SC-08608-S	1.16	0.72	PCI/G
Thorium-230	SC-08613-S	1.04	0.72	PCI/G
Thorium-230	SC-08618-S	0.91	0.72	PCI/G
Thorium-230	SC-08623-S	1.39	0.72	PCI/G

Average of Thorium-230 values is 1.07 PCI/G, which is below ALARA, 5.0 PCI/G.
Maximum single value is 1.39 PCI/G, which is below criteria, 6.2 PCI/G.

CU086 DATA REPORT (CONTINUED)

RADIUM-226

NUMBER OF RADIUM-226 SAMPLES IN DATABASE FOR THIS CU IS: 6

PARAMETER	LOCATION	CONC	DL	UNITS
RADIUM-226	SC-09020-S	2.3608	0.29	PCI/G
RADIUM-226	SC-08603-S	2.3154	0.38	PCI/G
RADIUM-226	SC-08608-S	2.4062	0.27	PCI/G
RADIUM-226	SC-08613-S	2.4970	0.34	PCI/G
RADIUM-226	SC-08618-S	2.4743	0.43	PCI/G
RADIUM-226	SC-08623-S	2.4743	0.29	PCI/G

Average of RADIUM-226 values is 2.421 PCI/G, which is below ALARA, 5.0 PCI/G.
Maximum single value is 2.497 PCI/G, which is below criteria, 6.2 PCI/G.

RADIUM-228

NUMBER OF RADIUM-228 SAMPLES IN DATABASE FOR THIS CU IS: 6

PARAMETER	LOCATION	CONC	DL	UNITS
RADIUM-228	SC-09020-S	1.41	0.44	PCI/G
RADIUM-228	SC-08603-S	1.25	0.35	PCI/G
RADIUM-228	SC-08608-S	1.33	0.51	PCI/G
RADIUM-228	SC-08613-S	1.16	0.40	PCI/G
RADIUM-228	SC-08618-S	1.03	0.60	PCI/G
RADIUM-228	SC-08623-S	1.39	0.38	PCI/G

Average of RADIUM-228 values is 1.26 PCI/G, which is below ALARA, 5.0 PCI/G.
Maximum single value is 1.41 PCI/G, which is below criteria, 6.2 PCI/G.

ARSENIC

NUMBER OF Arsenic SAMPLES IN DATABASE FOR THIS CU IS: 6

PARAMETER	LOCATION	CONC	DL	UNITS
Arsenic	SC-09020-S	9.8	0.43	UG/G
Arsenic	SC-08603-S	5.9	0.42	UG/G
Arsenic	SC-08608-S	5.4	0.43	UG/G
Arsenic	SC-08613-S	7.3	0.42	UG/G
Arsenic	SC-08618-S	6.1	0.43	UG/G
Arsenic	SC-08623-S	34.1	0.45	UG/G

Average of Arsenic values is 11.433 UG/G, which is below ALARA, 45.0 UG/G.
Maximum single value is 34.1 UG/G, which is below criteria, 75 UG/G.

CHROMIUM

NUMBER OF Chromium SAMPLES IN DATABASE FOR THIS CU IS: 6

PARAMETER	LOCATION	CONC	DL	UNITS
Chromium	SC-09020-S	17.2	0.36	UG/G
Chromium	SC-08603-S	13.2	0.35	UG/G
Chromium	SC-08608-S	14.6	0.36	UG/G
Chromium	SC-08613-S	14.5	0.35	UG/G
Chromium	SC-08618-S	12.4	0.36	UG/G
Chromium	SC-08623-S	16.7	0.38	UG/G

Average of Chromium values is 14.77 UG/G, which is below ALARA, 90.0 UG/G.
Maximum single value is 17.2 UG/G, which is below criteria, 110.0 UG/G.

CU086 DATA REPORT (CONTINUED)

LEAD

NUMBER OF Lead SAMPLES IN DATABASE FOR THIS CU IS: 6

PARAMETER	LOCATION	CONC	DL	UNITS
Lead	SC-09020-S	20.5	0.19	UG/G
Lead	SC-08603-S	10.9	0.19	UG/G
Lead	SC-08608-S	12.1	0.19	UG/G
Lead	SC-08613-S	14.8	0.19	UG/G
Lead	SC-08618-S	10.6	0.19	UG/G
Lead	SC-08623-S	18.5	0.20	UG/G

Average of Lead values is 14.57 UG/G, which is below ALARA, 240.0 UG/G.
Maximum single value is 20.5 UG/G, which is below criteria, 450 UG/G.

PCBs

NUMBER OF PCB SAMPLES IN DATABASE FOR THIS CU IS: 11

PARAMETER	LOCATION	CONC	DL	UNITS
PCB	SC-09020-S	0	40	UG/KG
PCB	SC-08603-S	0	39	UG/KG
PCB	SC-08604-S	1700	75	UG/KG
PCB	SC-08608-S	0	40	UG/KG
PCB	SC-08605-S	5800	390	UG/KG
PCB	SC-08609-S	740	38	UG/KG
PCB	SC-08613-S	180	38	UG/KG
PCB	SC-08610-S	1400	72	UG/KG
PCB	SC-08618-S	0	39	UG/KG
PCB	SC-08623-S	276	42	UG/KG
PCB	SC-08609-C	1600	77	UG/KG

The Average PCB value is 1063.27 UG/KG, which is ABOVE_ALARA. The Surface ALARA value is 650 UG/KG.
The maximum single concentration value is 5800 UG/KG, which does not exceed Criteria.

Weldon Spring Site Remedial Action Project
7295 Highway 94 South, St. Charles, Missouri, 63304

ES&H I.2.1.1, Rev. 1, 03/96

SOIL CONFIRMATION REMEDIATION DISPOSITION FORM

SECTION I

1. Work Package Number: WP420 2. Date: 9.17.96 3. Review Form #: 96-064
4. Remediation Unit Number: RU008 5. Confirmation Unit Number: CU087 (map attached)
6. Contaminants of Concern: X U-238 ___ Th-230 ___ Th-232 ___ Ra-226 ___ Ra-228 ___ TNT ___ PCB ___ PAH ___ As ___ Cr ___ Pb ___ Tl

7. Results average below ALARA goal(s)?	X Yes ___ No
8. All results below cleanup criteria?	X Yes ___ No
9. Any results greater than 3X criteria?	___ Yes X No
10. Hotspots present (less than 3X criteria)?	___ Yes X No

Parameter	Size	Concentration	Complies with Plan?
N/A			___ Yes ___ No
			___ Yes ___ No
			___ Yes ___ No
			___ Yes ___ No

11. Reviewer: [signature] Date: 09/17/96

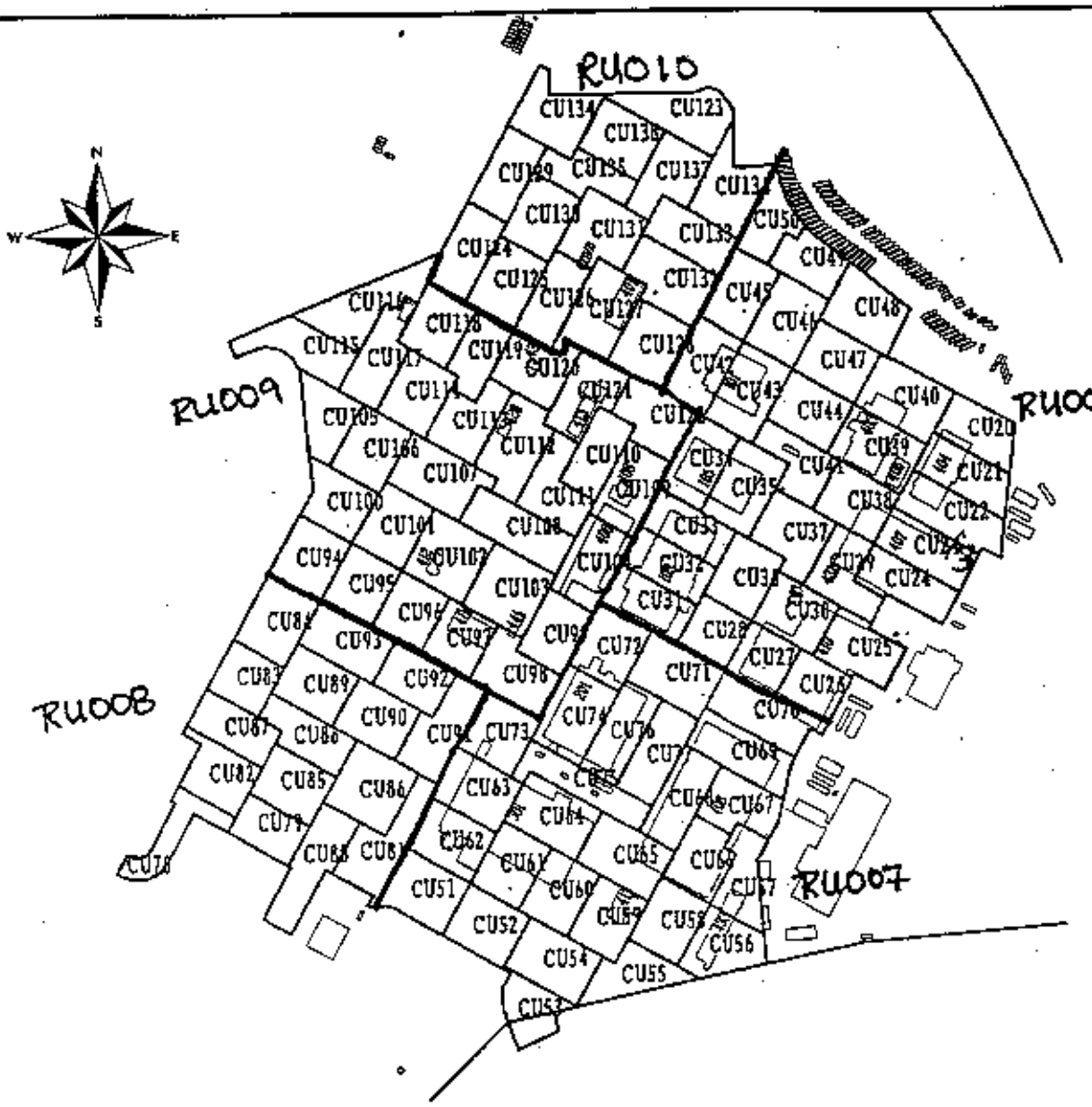
12. Reviewer Disposition Recommendation:
- X Release for Unrestricted Use (Section II)
- ___ Additional Excavation Required (Section IV)
- ___ ALARA Committee Required (Section III)

SECTION II *Results are ALARA. CU is released for unrestricted use.*

14. ES&H Manager: [signature] for [signature] Date: 9/17/96
15. DOE Project Manager/Engineer: [signature] Date: 9/17/96
16. Project Manager: [signature] Date: 9/17/96
17. Construction Engineer: Darrell L. Capps Date: 9/17/96

SEE ATTACHED RESULTS AND MAP

Note: ① No Utilities
② Please note new boundaries. Remaining portion will be captured under WP437



LEGEND

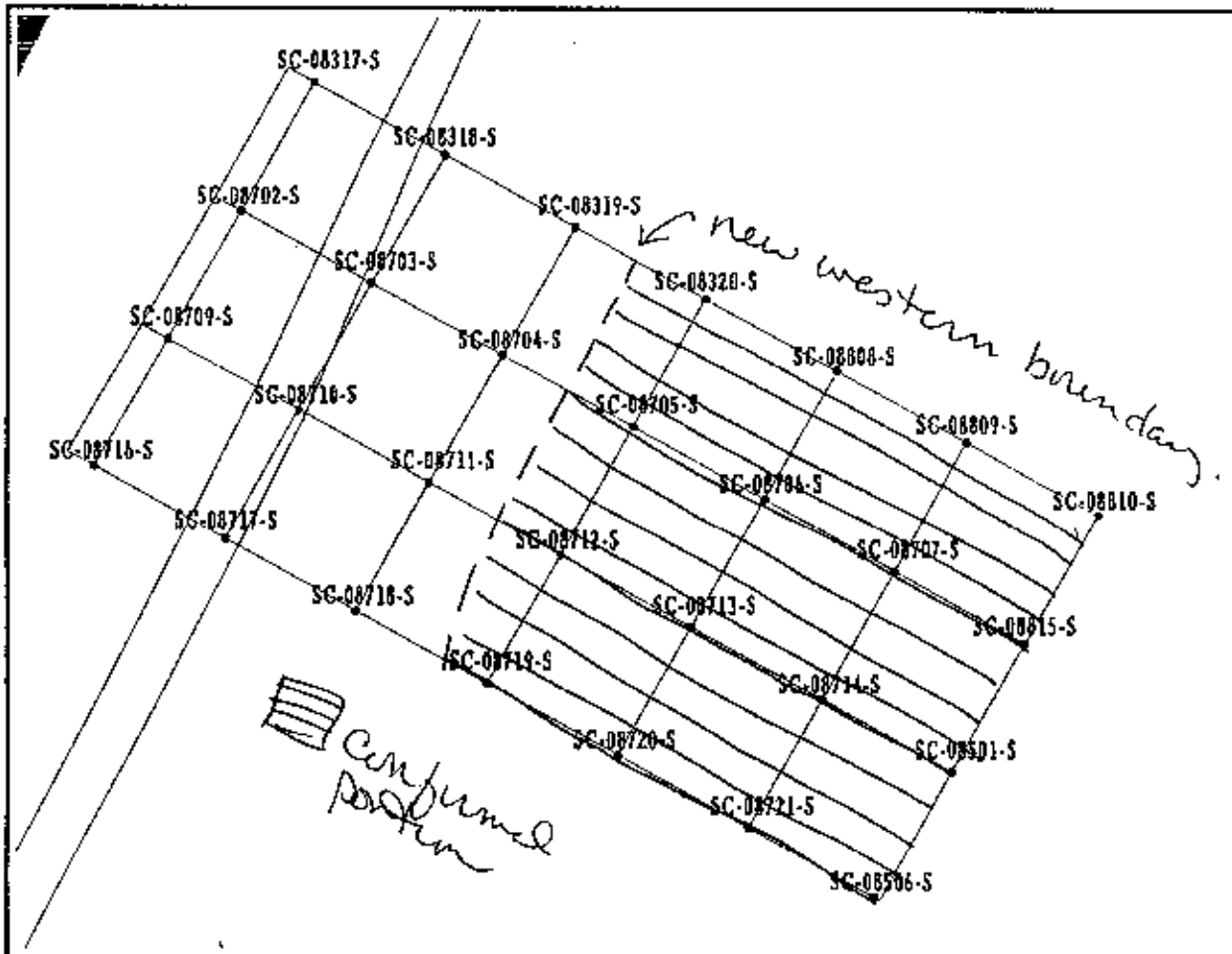
RU006 -- CU020 THRU CU050
RU007 -- CU051 THRU CU077
RU008 -- CU078 THRU CU093
RU009 -- CU094 THRU CU122
RU010 -- CU123 THRU CU138

Review Form# 96-064

Remedial Units for WP-420

Figure: 1-1

REPORT NO.: DOE/OR/21548-590		EXHIBIT NO.: E/CP/006/0196	
ORIGINATOR: EMD	DRAWN BY: WSSRAP GIS	DATE: 01/96	



Renew Form #96-064

10 5 0 10 METERS

30 15 0 30 FEET

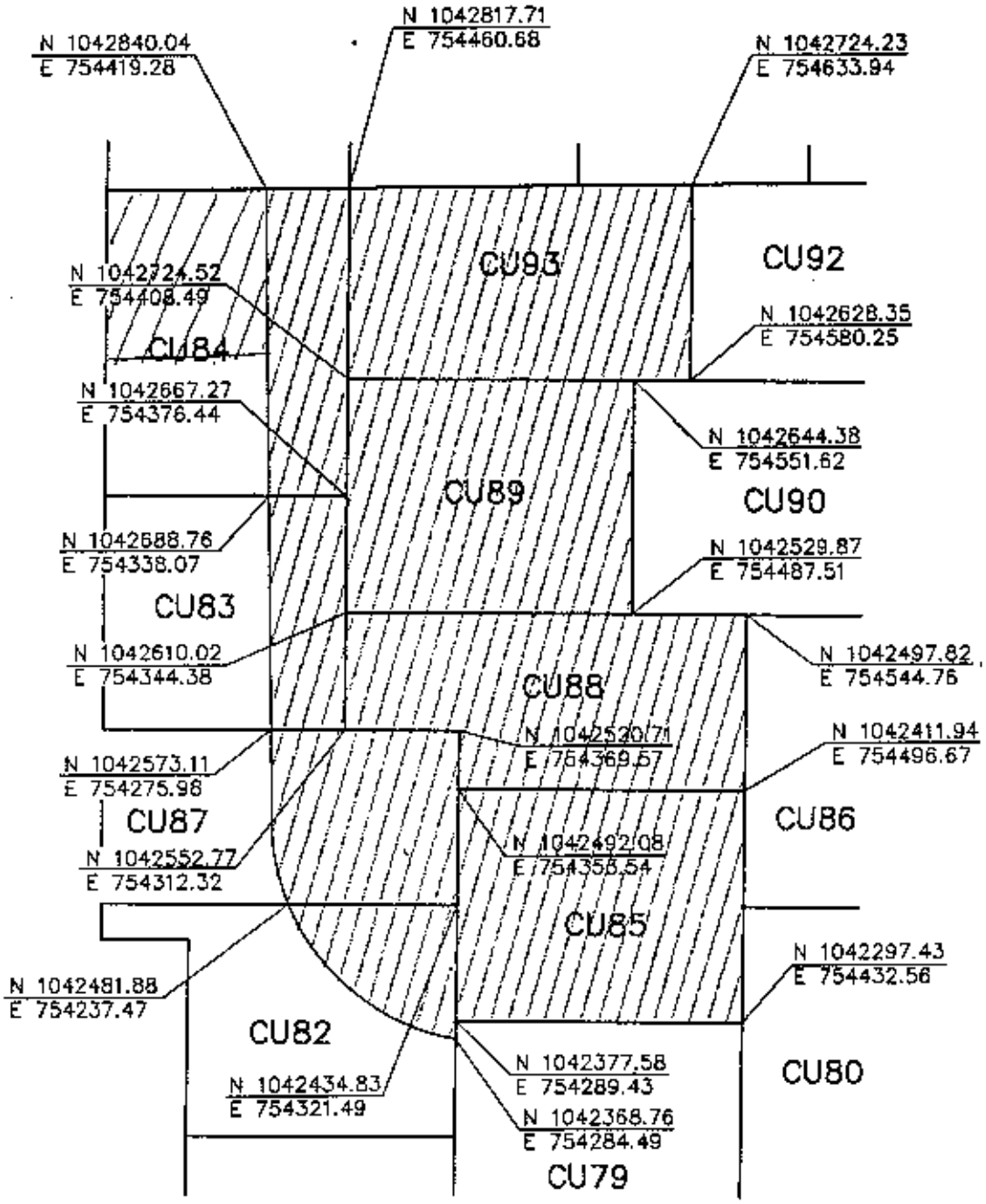
See attached sheet for specific boundary.

N E S

Sample Locations in Remedial Unit RU008 Confirmation Unit CU087

Figure B-68

EXHIBIT NO.: A/CP/150/1295		REPORT NO.: DOE/OR/21548-590	
ORIGINATOR: MGL	DRAWN BY: WSSRAP GIS	DATE: 3/96	



Review Form # 96-064

CONFIRMATION REQUEST – WORK ZONE 3

AVISCO, INC.

WELDON SPRING SITE REMEDIAL ACTION PROJECT
FOUNDATIONS AND CONTAMINATED SOIL REMOVAL

DRAWN BY: D.E.H.	SUBCONTRACT NO.: 35899-SC-WP420
APPROVED BY: W.P.	FILE NAME: CUZONE3A.DWG DATE: 04-09-96
SCALE: 1"=100'	PAY ITEM: N/A

CU087 DATA REPORT

PARAMETER	CONC	DL	LOCATION	UNITS
URANIUM-238 (16 SAMPLES)				
	1.730	3.460	SC-08705-S	PCI/G
	2.095	4.190	SC-08706-S	PCI/G
	1.670	3.340	SC-08707-S	PCI/G
	2.310	4.620	SC-08712-S	PCI/G
	1.670	3.340	SC-08713-S	PCI/G
	1.945	3.890	SC-08714-S	PCI/G
	2.230	2.420	SC-08719-S	PCI/G
	2.020	4.040	SC-08720-S	PCI/G
	1.520	3.040	SC-08721-S	PCI/G
	5.210	2.690	SC-08320-S	PCI/G
	1.925	3.850	SC-08808-S	PCI/G
	2.295	4.590	SC-08809-S	PCI/G
	3.010	1.680	SC-08810-S	PCI/G
	2.110	4.220	SC-08815-S	PCI/G
	2.190	3.800	SC-08501-S	PCI/G
	3.660	2.330	SC-08506-S	PCI/G

URANIUM-238 AVERAGE = 2.349 PCI/G

Weldon Spring Site Remedial Action Project
7295 Highway 94 South, St. Charles, Missouri, 63304

ES&H 1.2.1.1, Rev. 1, 03/96

SOIL CONFIRMATION REMEDIATION DISPOSITION FORM

SECTION I

1. Work Package Number: WP470 2. Date: 09-17-96 3. Review Form #: 96-001

4. Remediation Unit Number: RU008 5. Confirmation Unit Number: CU088 (map attached)

6. Contaminants of Concern: X U-238 ____ Th-230 ____ Th-232 ____ Ra-226 ____ Ra-228
____ TNT ____ PCB ____ PAH ____ As ____ Cr ____ Pb ____ Tl

7. Results average below ALARA goal(s)?	X Yes ____ No
8. All results below cleanup criteria?	X Yes ____ No
9. Any results greater than 3X criteria?	____ Yes X No
10. Hotspots present (less than 3X criteria)?	____ Yes X No

Parameter	Size	Concentration	Complies with Plan?
NA			____ Yes ____ No
			____ Yes ____ No
			____ Yes ____ No
			____ Yes ____ No

11. Reviewer: Mel A Lith Date: 09/17/96

12. Reviewer Disposition Recommendation: X Release for Unrestricted Use (Section II)
____ Additional Excavation Required (Section IV)
____ ALARA Committee Required (Section III)

SECTION II *Results are ALARA. CU is released for unrestricted use.*

14. ES&H Manager: [signature] Date: 9/17/96

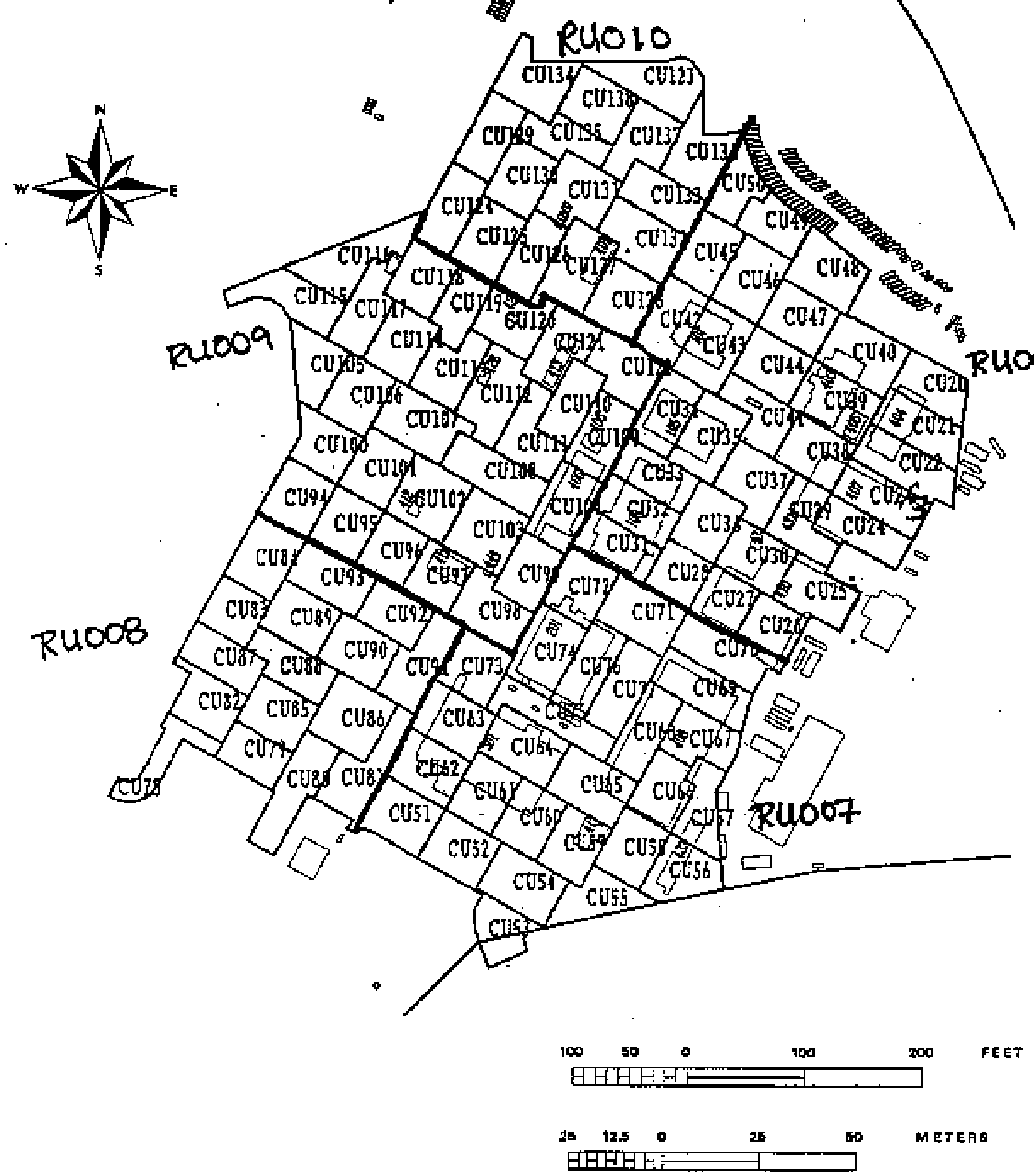
15. DOE Project Manager/Engineer: [signature] Date: 9/17/96

16. Project Manager: [signature] Date: 9/17/96

17. Construction Engineer: Daniel L. Capps Date: 9/17/96

SEE ATTACHED RESULTS AND MAP

No utilities



LEGEND

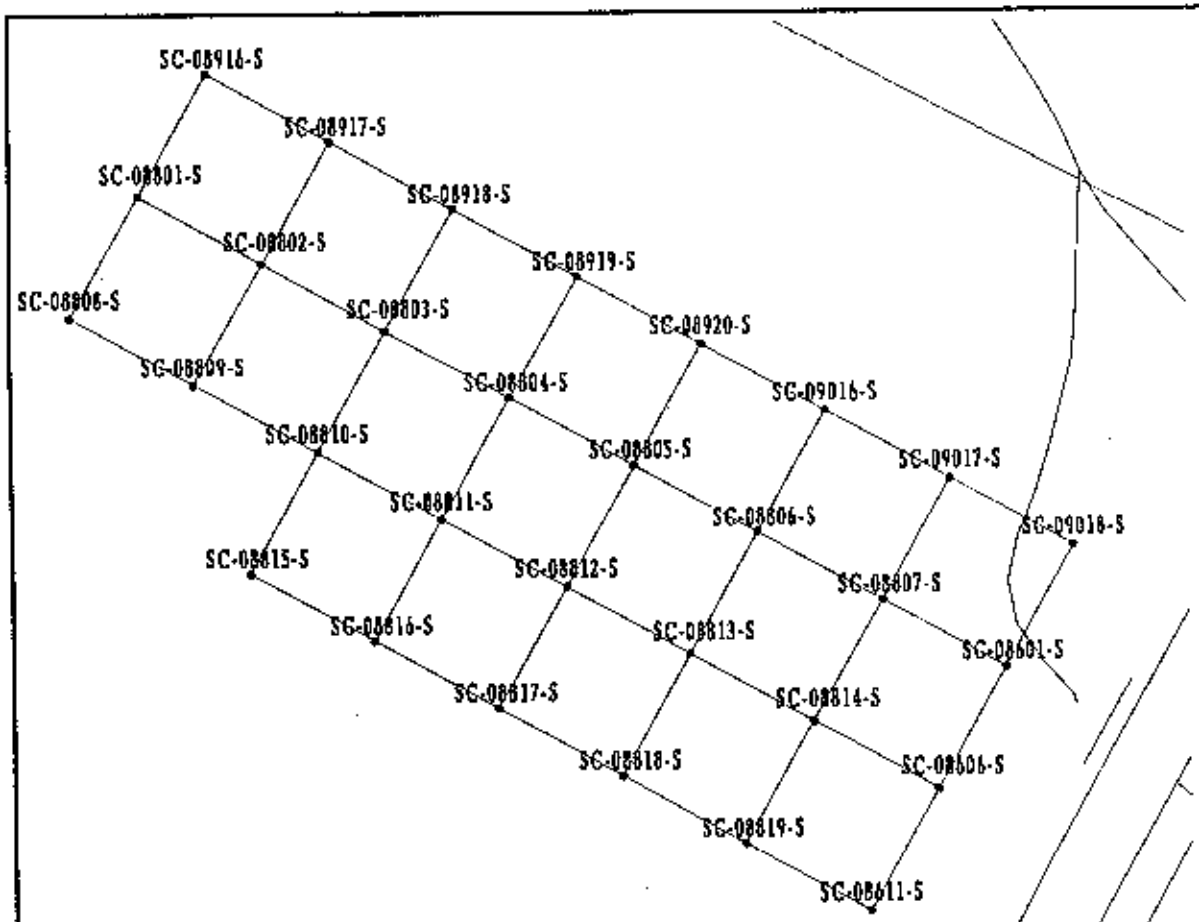
RU006 -- CU020 THRU CU050
RU007 -- CU051 THRU CU077
RU008 -- CU078 THRU CU093
RU009 -- CU094 THRU CU122
RU010 -- CU123 THRU CU138

Review Form# 96-061

Remedial Units for WP-420

Figure: 1-1

REPORT NO.:	DOE/OR/21548-590		EXHIBIT NO.:	E/CP/006/0196	
ORIGINATOR:	EMD	DRAWN BY:	WSSRAP GIS	DATE:	01/96



Review Frm #96-061

10 5 0 10 METERS

30 15 0 30 FEET

N

S

Sample Locations in Remedial Unit RU008 Confirmation Unit CU088

Figure B-69

EXHIBIT NO.: A/CP/151/1295		REPORT NO.: DOE/OR/21548-590	
ORIGINATOR: MGL	DRAWN BY: WSSRAP GIS	DATE: 3/96	

CU088 DATA REPORT

PARAMETER	CONC	DL	LOCATION	UNITS
URANIUM-238 (30 SAMPLES)				
	2.025	4.050	SC-08801-S	PCI/G
	1.725	3.450	SC-08802-S	PCI/G
	2.130	4.260	SC-08803-S	PCI/G
	2.650	3.120	SC-08804-S	PCI/G
	1.610	3.220	SC-08805-S	PCI/G
	3.480	1.820	SC-08806-S	PCI/G
	3.850	3.140	SC-08807-S	PCI/G
	1.925	3.850	SC-08808-S	PCI/G
	2.295	4.590	SC-08809-S	PCI/G
	3.010	1.680	SC-08810-S	PCI/G
	4.210	2.530	SC-08811-S	PCI/G
	2.105	4.210	SC-08812-S	PCI/G
	2.015	4.030	SC-08813-S	PCI/G
	1.675	3.350	SC-08814-S	PCI/G
	2.110	4.220	SC-08815-S	PCI/G
	3.490	3.060	SC-08816-S	PCI/G
	2.135	4.270	SC-08817-S	PCI/G
	2.790	2.920	SC-08818-S	PCI/G
	1.830	2.300	SC-08819-S	PCI/G
	2.295	4.590	SC-08916-S	PCI/G
	3.950	2.270	SC-08917-S	PCI/G
	2.145	4.290	SC-08918-S	PCI/G
	2.090	4.180	SC-08919-S	PCI/G
	3.130	2.300	SC-08920-S	PCI/G
	2.210	4.420	SC-09016-S	PCI/G
	3.070	1.970	SC-09017-S	PCI/G
	4.280	2.350	SC-09018-S	PCI/G
	2.590	4.180	SC-08601-S	PCI/G
	2.235	4.470	SC-08606-S	PCI/G
	3.670	2.610	SC-08611-S	PCI/G

URANIUM-238 AVERAGE = 2.624 PCI/G

Weldon Spring Site Remedial Action Project
7295 Highway 94 South, St. Charles, Missouri, 63304

ES&H 1.2.1.1, Rev. 1, 03/96

SOIL CONFIRMATION REMEDIATION DISPOSITION FORM

SECTION I

1. Work Package Number: WP420 2. Date: 09.17.96 3. Review Form #: 96-065

4. Remediation Unit Number: RU008 5. Confirmation Unit Number: CU089 (map attached)

6. Contaminants of Concern: X U-238 ____ Th-230 ____ Th-232 ____ Ra-226 ____ Ra-228
____ TNT ____ PCB ____ PAH ____ As ____ Cr ____ Pb ____ Tl

7. Results average below ALARA goal(s)?	X Yes ____ No
8. All results below cleanup criteria?	X Yes ____ No
9. Any results greater than 3X criteria?	____ Yes X No
10. Hotspots present (less than 3X criteria)?	____ Yes X No

Parameter	Size	Concentration	Complies with Plan?
N/A			____ Yes ____ No
			____ Yes ____ No
			____ Yes ____ No
			____ Yes ____ No

11. Reviewer: Mehran A. Lutz Date: 09/17/96

12. Reviewer Disposition Recommendation:
X Release for Unrestricted Use (Section II)
____ Additional Excavation Required (Section IV)
____ ALARA Committee Required (Section III)

SECTION II *Results are ALARA. CU is released for unrestricted use.*

14. ES&H Manager: for Date: 9/17/96

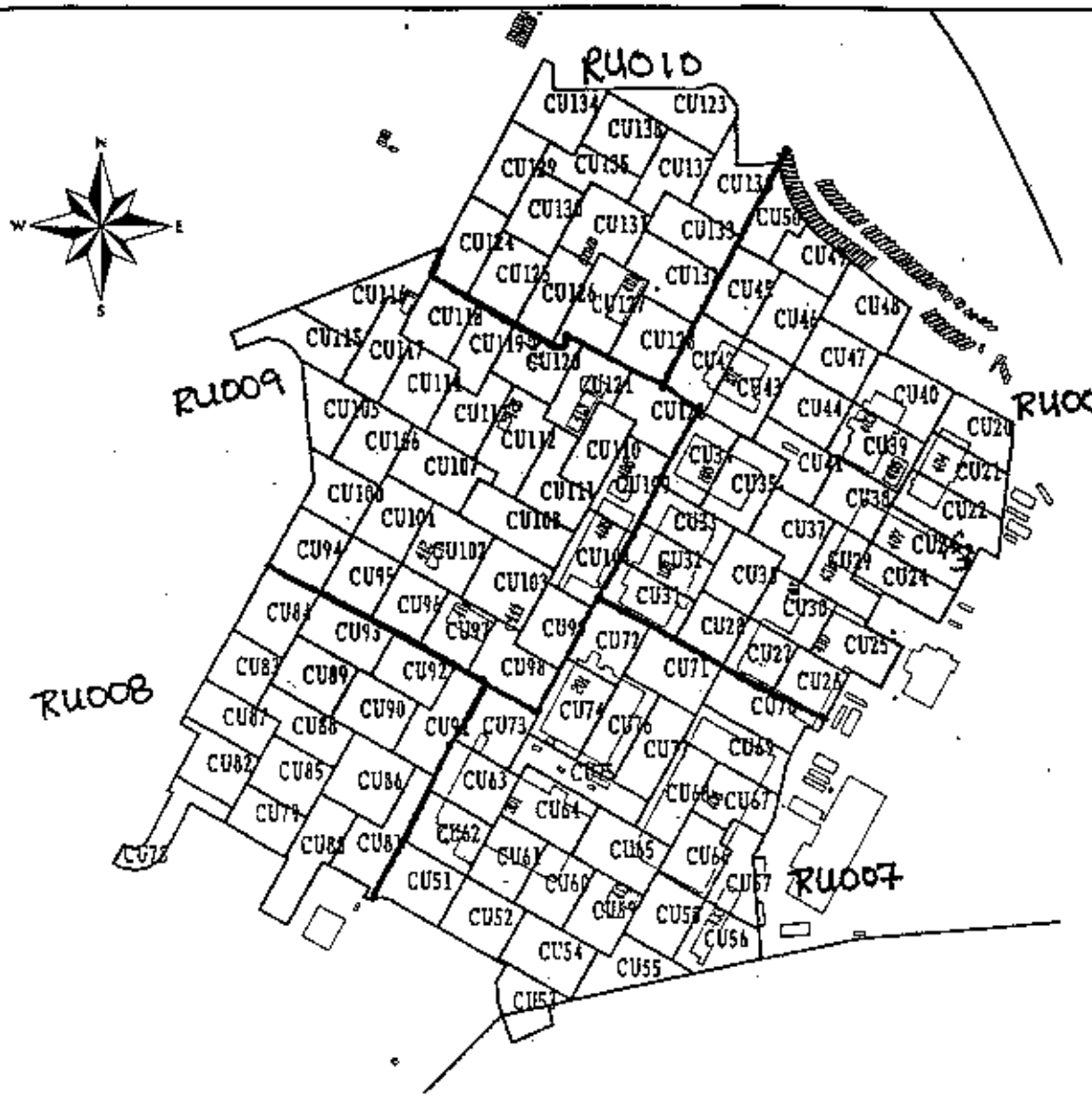
15. DOE Project Manager/Engineer: Thomas C. Tauling Date: 9/17/96

16. Project Manager: Date: 9/17/96

17. Construction Engineer: Darrell L. Lapp Date: 9/17/96

SEE ATTACHED RESULTS AND MAP

Note: No Utilities.



LEGEND

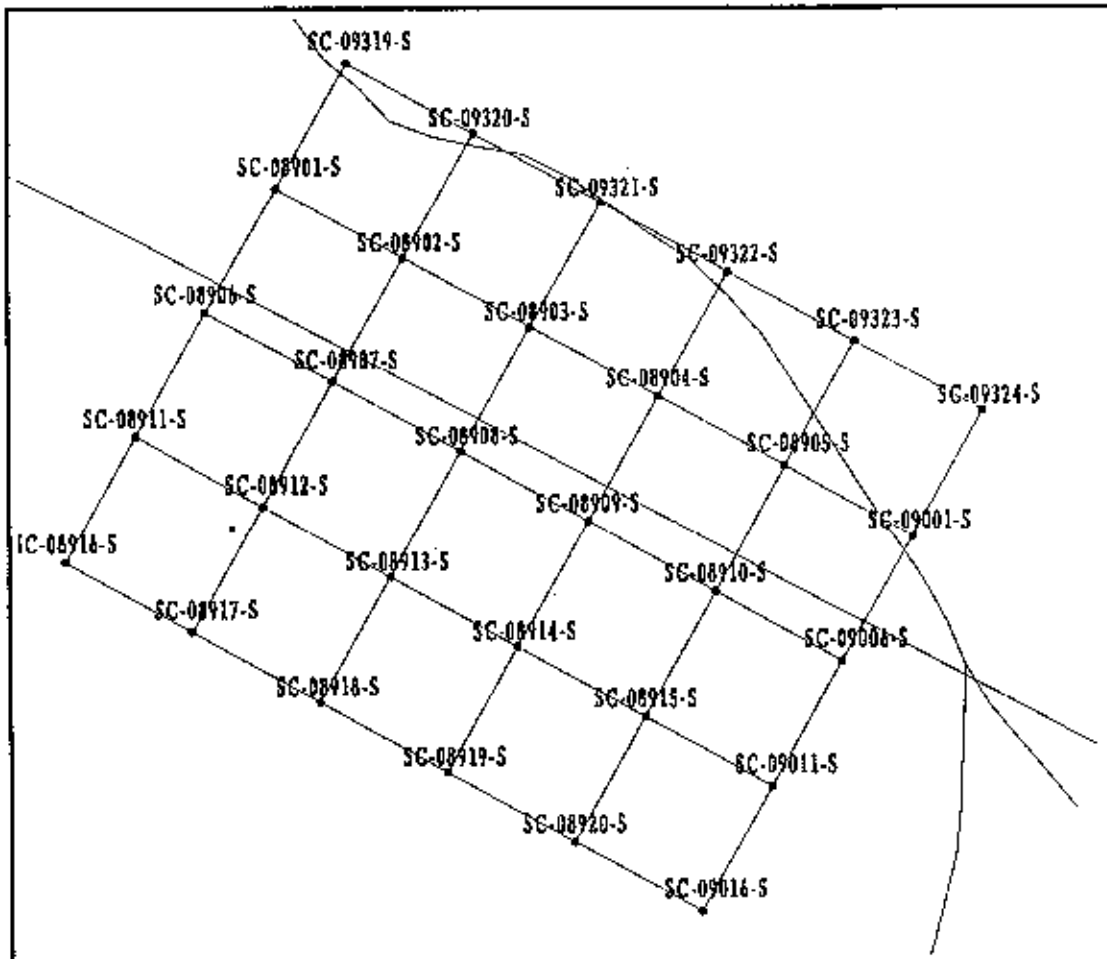
RU006 -- CU020 THRU CU050
RU007 -- CU051 THRU CU077
RU008 -- CU078 THRU CU093
RU009 -- CU094 THRU CU122
RU010 -- CU123 THRU CU138

Review Form# 96-065

Remedial Units for WP-420

Figure: 1-1

REPORT NO.: DOE/OR/21548-590		EXHIBIT NO.: E/CP/006/0196	
ORIGINATOR: EMD	DRAWN BY: WSSRAP GIS	DATE: 01/96	



10 5 0 10 METERS

30 15 0 30 FEET

N
W E
S

Review Form # 96-065

Sample Locations in Remedial Unit RU008 Confirmation Unit CU089

Figure B-70

EXHIBIT NO.: A/CP/152/1295		REPORT NO.: DOE/OR/21548-590	
ORIGINATOR: MGL	DRAWN BY: WSSRAP GIS	DATE: 3/96	

CU089 DATA REPORT

PARAMETER	CONC	DL	LOCATION	UNITS
URANIUM-238 (30 SAMPLES)				
	2.135	4.270	SC-08901-S	PCI/G
	1.715	3.430	SC-08902-S	PCI/G
	2.170	4.340	SC-08903-S	PCI/G
	1.450	2.900	SC-08904-S	PCI/G
	2.145	4.290	SC-08905-S	PCI/G
	1.755	3.510	SC-08906-S	PCI/G
	2.190	4.380	SC-08907-S	PCI/G
	3.070	2.230	SC-08908-S	PCI/G
	2.060	4.120	SC-08909-S	PCI/G
	2.215	4.430	SC-08910-S	PCI/G
	3.020	2.810	SC-08911-S	PCI/G
	4.710	2.360	SC-08912-S	PCI/G
	3.370	2.220	SC-08913-S	PCI/G
	2.185	4.370	SC-08914-S	PCI/G
	3.710	2.820	SC-08915-S	PCI/G
	2.295	4.590	SC-08916-S	PCI/G
	3.950	2.270	SC-08917-S	PCI/G
	2.145	4.290	SC-08918-S	PCI/G
	2.090	4.180	SC-08919-S	PCI/G
	3.130	2.530	SC-08920-S	PCI/G
	1.710	3.420	SC-09319-S	PCI/G
	5.170	3.100	SC-09320-S	PCI/G
	2.485	4.970	SC-09321-S	PCI/G
	1.670	3.340	SC-09322-S	PCI/G
	2.265	4.530	SC-09323-S	PCI/G
	3.130	2.300	SC-09324-S	PCI/G
	5.560	2.690	SC-09001-S	PCI/G
	2.280	4.560	SC-09006-S	PCI/G
	4.310	3.280	SC-09011-S	PCI/G
	2.215	4.420	SC-09016-S	PCI/G

URANIUM-238 AVERAGE = 2.743 PCI/G

Weldon Spring Site Remedial Action Project
7295 Highway 94 South, St. Charles, Missouri, 63304

ES&H 1.2.1.1, Rev. 1, 03/96

SOIL CONFIRMATION REMEDIATION DISPOSITION FORM

SECTION I

1. Work Package Number: WP420 2. Date: 10/11/96 3. Review Form #: 96-078

4. Remediation Unit Number: RU008 5. Confirmation Unit Number: CU090 (map attached)

6. Contaminants of Concern: X U-238 X Th-230 ___ Th-232 X Ra-226 X Ra-228
___ TNT X PCB ___ PAH X As X Cr X Pb ___ Tl

7. Results average below ALARA goal(s)?	X Yes ___ No
8. All results below cleanup criteria?	X Yes ___ No
9. Any results greater than 3X criteria?	___ Yes X No
10. Hotspots present (less than 3X criteria)?	___ Yes X No

Parameter	Size	Concentration	Complies with Plan?
/			___ Yes ___ No
N/A			___ Yes ___ No
			___ Yes ___ No
/			___ Yes ___ No

11. Reviewer: Melvin H. Finch Date: 10/11/96

12. Reviewer Disposition Recommendation:
X Release for Unrestricted Use (Section II)
___ Additional Excavation Required (Section IV)
___ ALARA Committee Required (Section III)

SECTION II *Results are ALARA. CU is released for unrestricted use.*

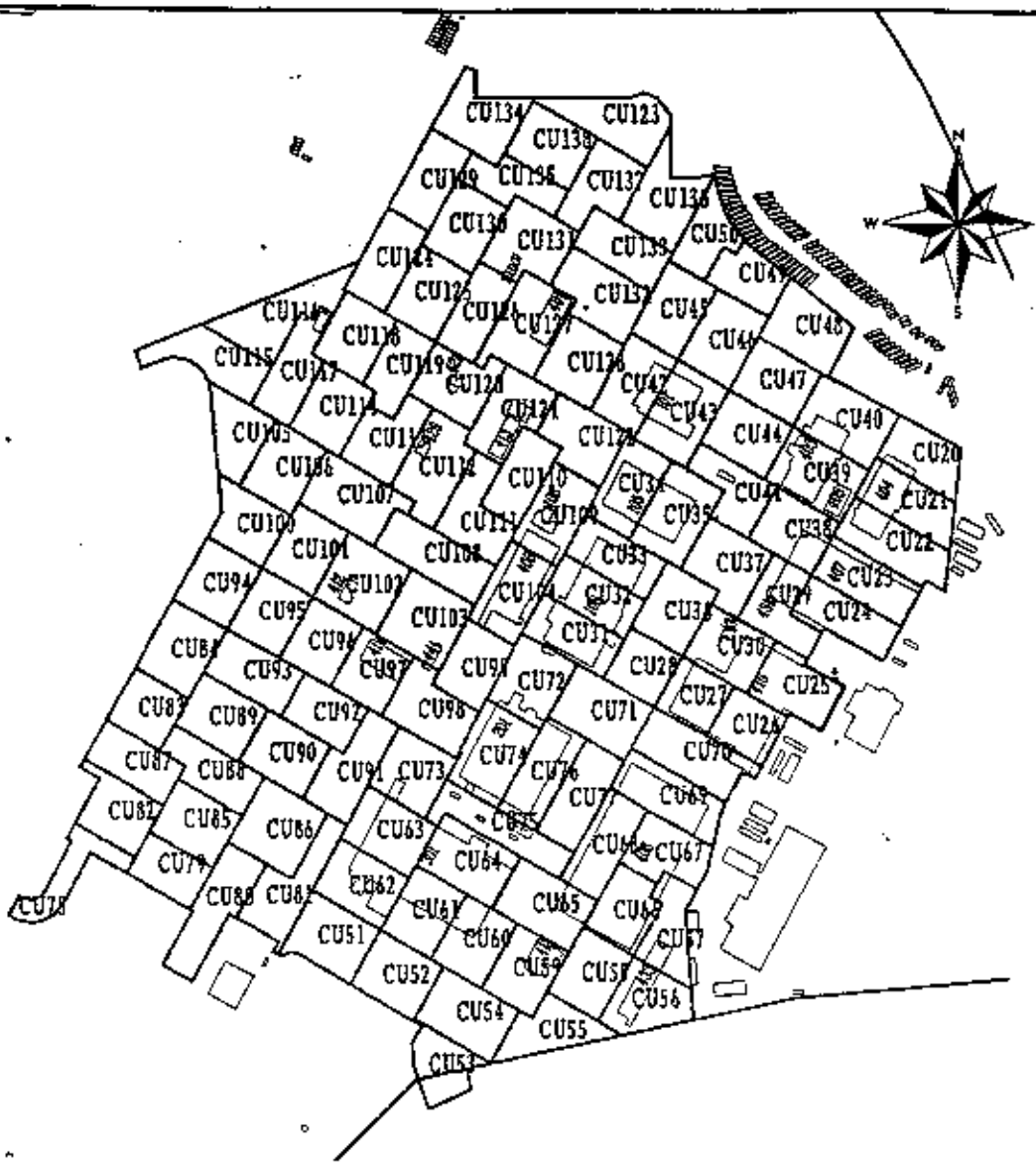
14. ES&H Manager: [signature] Date: 10/11/96

15. DOE Project Manager/Engineer: [signature] Date: 10/11/96

16. Project Manager: [signature] Date: 10/11/96

17. Construction Engineer: [signature] Date: 10/11/96

SEE ATTACHED RESULTS AND MAP



LEGEND

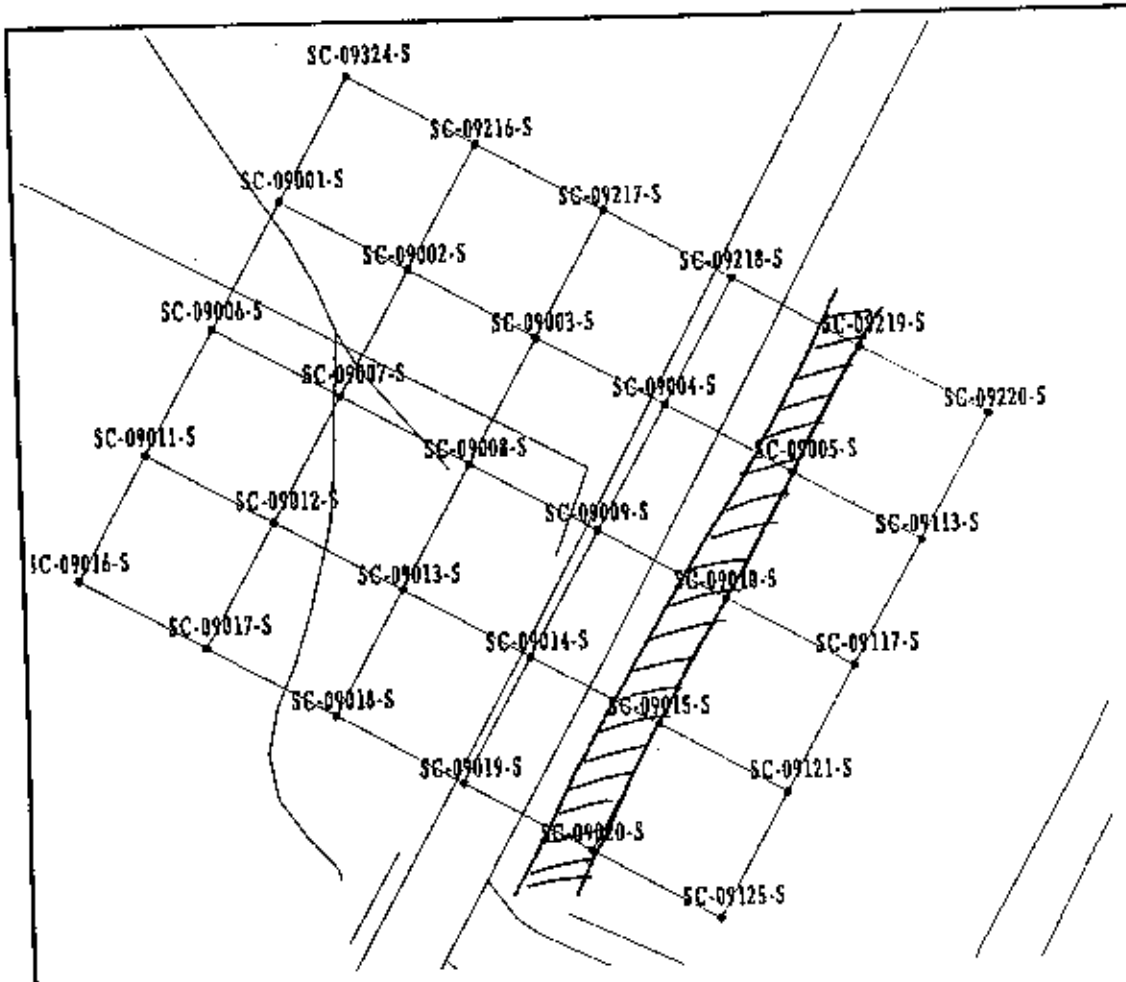
RU006 -- CU020 THRU CU050
RU007 -- CU051 THRU CU077
RU008 -- CU078 THRU CU093
RU009 -- CU094 THRU CU122
RU010 -- CU123 THRU CU138

Review Form # 96-078

Remedial Units for WP-420

Figure: 1-1

REPORT NO.: DOE/OR/21548-590		EXHIBIT NO.:	E/CP/006/0196
ORIGINATOR: EMD	DRAWN BY: WSSRAP	DATE:	01/96



utility trench

Review Form # 96-078

10 5 0 10 METERS

30 15 0 30 FEET

N E S W

Sample Locations in Remedial Unit RU008 Confirmation Unit CU090

Figure B-71

EXHIBIT NO.: A/CP/153/1295		REPORT NO.: DOE/OR/21548-590	
ORIGINATOR: MGL	DRAWN BY: WSSRAP GIS	DATE: 3/96	

CU090 DATA REPORT

URANIUM-238

NUMBER OF URANIUM-238 SAMPLES IN DATABASE FOR THIS CU IS: 30

PARAMETER	LOCATION	CONC	DL	UNITS
URANIUM-238	SC-09324-S	3.130	2.30	PCI/G
URANIUM-238	SC-09216-S	4.410	2.30	PCI/G
URANIUM-238	SC-09001-S	5.560	2.69	PCI/G
URANIUM-238	SC-09217-S	1.570	3.14	PCI/G
URANIUM-238	SC-09002-S	7.280	4.23	PCI/G
URANIUM-238	SC-09218-S	1.955	3.91	PCI/G
URANIUM-238	SC-09006-S	2.280	4.56	PCI/G
URANIUM-238	SC-09003-S	2.550	2.91	PCI/G
URANIUM-238	SC-09219-S	1.605	3.21	PCI/G
URANIUM-238	SC-09007-S	3.610	2.54	PCI/G
URANIUM-238	SC-09004-S	2.170	4.34	PCI/G
URANIUM-238	SC-09220-S	8.580	3.25	PCI/G
URANIUM-238	SC-09011-S	4.310	3.28	PCI/G
URANIUM-238	SC-09008-S	3.680	2.23	PCI/G
URANIUM-238	SC-09005-S	1.945	3.89	PCI/G
URANIUM-238	SC-09012-S	4.550	2.27	PCI/G
URANIUM-238	SC-09009-S	2.085	4.17	PCI/G
URANIUM-238	SC-09113-S	10.620	3.59	PCI/G
URANIUM-238	SC-09016-S	2.210	4.42	PCI/G
URANIUM-238	SC-09013-S	5.450	3.50	PCI/G
URANIUM-238	SC-09010-S	3.580	3.84	PCI/G
URANIUM-238	SC-09017-S	3.070	1.97	PCI/G
URANIUM-238	SC-09014-S	2.155	4.31	PCI/G
URANIUM-238	SC-09117-S	16.19	5.43	PCI/G
URANIUM-238	SC-09018-S	4.280	2.35	PCI/G
URANIUM-238	SC-09015-S	2.480	2.42	PCI/G
URANIUM-238	SC-09019-S	2.215	4.43	PCI/G
URANIUM-238	SC-09121-S	11.950	4.17	PCI/G
URANIUM-238	SC-09020-S	1.685	3.37	PCI/G
URANIUM-238	SC-09125-S	10.420	2.18	PCI/G

Average of URANIUM-238 values is 4.586 PCI/G, which is below ALARA of 30.0 PCI/G.
Maximum single value is 16.19 PCI/G, which is below criteria, 120.0 PCI/G.

THORIUM-230

NUMBER OF Thorium-230 SAMPLES IN DATABASE FOR THIS CU IS: 5

PARAMETER	LOCATION	CONC	DL	UNITS
Thorium-230	SC-09219-S	0.98	0.72	PCI/G
Thorium-230	SC-09005-S	0.91	0.72	PCI/G
Thorium-230	SC-09010-S	1.35	0.72	PCI/G
Thorium-230	SC-09015-S	1.08	0.72	PCI/G
Thorium-230	SC-09020-S	1.01	0.72	PCI/G

Average of Thorium-230 values is 1.066 PCI/G, which is below ALARA of 5.0 PCI/G.
Maximum single value is 1.35 PCI/G, which is below criteria of 6.2 PCI/G.

CU090 DATA REPORT (CONTINUED)

RADIUM-226

NUMBER OF RADIUM-226 SAMPLES IN DATABASE FOR THIS CU IS: 5

PARAMETER	LOCATION	CONC	DL	UNITS
RADIUM-226	SC-09219-S	2.3835	0.32	PCI/G
RADIUM-226	SC-09005-S	2.0657	0.21	PCI/G
RADIUM-226	SC-09010-S	2.4062	0.33	PCI/G
RADIUM-226	SC-09015-S	2.2927	0.24	PCI/G
RADIUM-226	SC-09020-S	2.3608	0.29	PCI/G

Average of RADIUM-226 values is 2.302 PCI/G, which is below ALARA of 5.0 PCI/G.
Maximum single value is 2.4062 PCI/G, which is below criteria, 6.2 PCI/G.

RADIUM-228

NUMBER OF RADIUM-228 SAMPLES IN DATABASE FOR THIS CU IS: 5

PARAMETER	LOCATION	CONC	DL	UNITS
RADIUM-228	SC-09219-S	1.170	0.35	PCI/G
RADIUM-228	SC-09005-S	1.770	0.47	PCI/G
RADIUM-228	SC-09010-S	0.585	1.17	PCI/G
RADIUM-228	SC-09015-S	1.330	0.37	PCI/G
RADIUM-228	SC-09020-S	1.410	0.44	PCI/G

Average of RADIUM-228 values is 1.253 PCI/G, which is below ALARA of 5.0 PCI/G.
Maximum single value is 1.77 PCI/G, which is below criteria of 6.2 PCI/G.

CU090 DATA REPORT (CONTINUED)

ARSENIC

NUMBER OF Arsenic SAMPLES IN DATABASE FOR THIS CU IS: 5

PARAMETER	LOCATION	CONC	DL	UNITS
Arsenic	SC-09219-S	16.9	0.42	UG/G
Arsenic	SC-09005-S	4.7	0.45	UG/G
Arsenic	SC-09010-S	9.5	0.43	UG/G
Arsenic	SC-09015-S	12.2	0.45	UG/G
Arsenic	SC-09020-S	9.8	0.43	UG/G

Average of Arsenic values is 10.62 UG/G, which is below ALARA of 45.0 UG/G.
Maximum single value is 16.9 UG/G, which is below criteria of 75 UG/G.

CHROMIUM

NUMBER OF Chromium SAMPLES IN DATABASE FOR THIS CU IS: 5

PARAMETER	LOCATION	CONC	DL	UNITS
Chromium	SC-09219-S	18.3	0.35	UG/G
Chromium	SC-09005-S	22.3	0.37	UG/G
Chromium	SC-09010-S	17.2	0.36	UG/G
Chromium	SC-09015-S	16.7	0.37	UG/G
Chromium	SC-09020-S	17.2	0.36	UG/G

Average of Chromium values is 18.34 UG/G, which is below ALARA, 90.0 UG/G.
Maximum single value is 22.3 UG/G, which is below criteria, 110.0 UG/G.

LEAD

NUMBER OF Lead SAMPLES IN DATABASE FOR THIS CU IS: 5

PARAMETER	LOCATION	CONC	DL	UNITS
Lead	SC-09219-S	23.8	0.19	UG/G
Lead	SC-09005-S	27.3	0.20	UG/G
Lead	SC-09010-S	19.0	0.19	UG/G
Lead	SC-09015-S	16.5	0.20	UG/G
Lead	SC-09020-S	20.5	0.19	UG/G

Average of Lead values is 21.42 UG/G, which is below ALARA, 240.0 UG/G.
Maximum single value is 27.3 UG/G, which is below criteria, 450 UG/G.

PCBs

NUMBER OF PCB SAMPLES IN DATABASE FOR THIS CU IS: 5

PARAMETER	LOCATION	CONC	DL	UNITS
PCB	SC-09219-S	0	39	UG/KG
PCB	SC-09005-S	0	41	UG/KG
PCB	SC-09010-S	0	40	UG/KG
PCB	SC-09015-S	0	41	UG/KG
PCB	SC-09020-S	0	40	UG/KG

Average of PCB values is NA.
Maximum single value is NA.

Weldon Spring Site Remedial Action Project
7295 Highway 94 South, St. Charles, Missouri, 63304

ES&H 1.2.1.1, Rev. 1, 03/96

SOIL CONFIRMATION REMEDIATION DISPOSITION FORM

SECTION I

1. Work Package Number: WP420 2. Date: 10/16/96 3. Review Form #: 96-080

4. Remediation Unit Number: RU008 5. Confirmation Unit Number: CU091 (map attached)

6. Contaminants of Concern: X U-238 ____ Th-230 ____ Th-232 ____ Ra-226 ____ Ra-228
____ TNT ____ PCB ____ PAH ____ As ____ Cr ____ Pb ____ Tl

7. Results average below ALARA goal(s)?	X Yes ____ No
8. All results below cleanup criteria?	X Yes ____ No
9. Any results greater than 3X criteria?	____ Yes X No
10. Hotspots present (less than 3X criteria)?	____ Yes X No

Parameter	Size	Concentration	Complies with Plan?
N/A			____ Yes ____ No
			____ Yes ____ No
			____ Yes ____ No
			____ Yes ____ No

11. Reviewer: Melvin A Kirby Date: 10/16/96

12. Reviewer Disposition Recommendation: X Release for Unrestricted Use (Section II)
____ Additional Excavation Required (Section IV)
____ ALARA Committee Required (Section III)

SECTION II *Results are ALARA. CU is released for unrestricted use.*

14. ES&H Manager: James A Klein for KAM. Date: 10/16/96

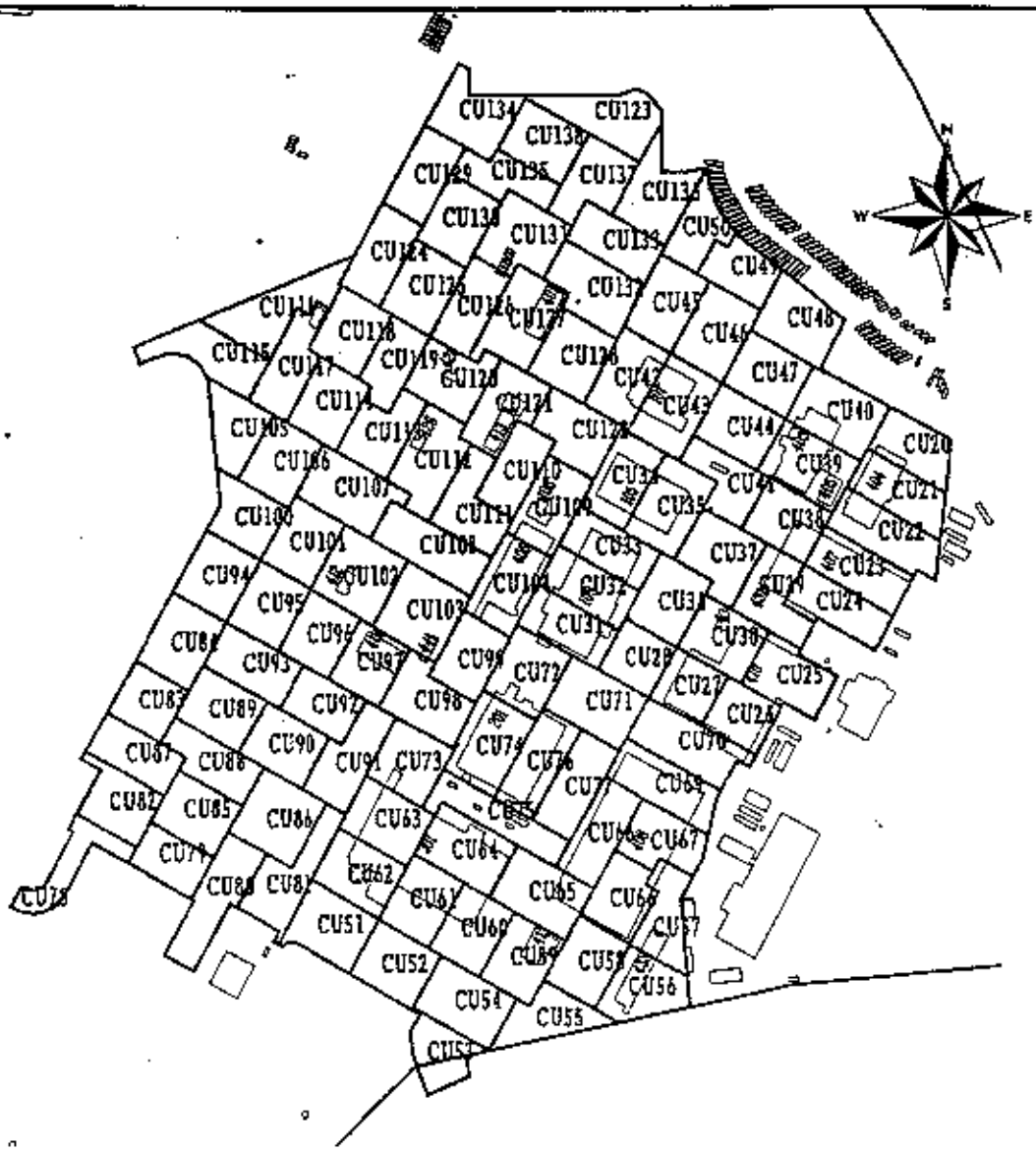
15. DOE Project Manager/Engineer: Thomas C Imbus Date: 10/16/96

16. Project Manager: Date: 10/16/96

17. Construction Engineer: Date: 10/16/96

SEE ATTACHED RESULTS AND MAP

Note: No Utility



LEGEND

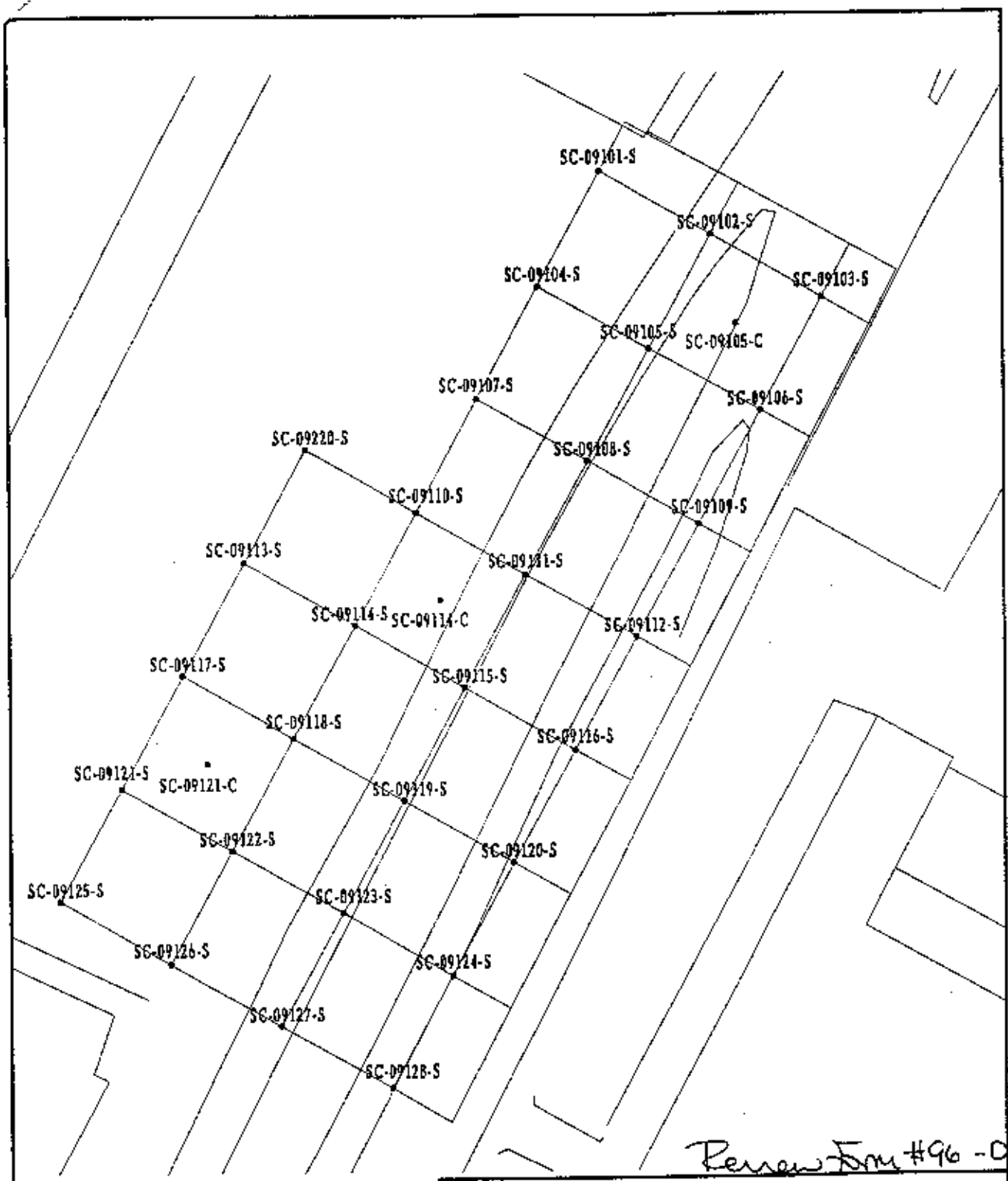
RU006 -- CU020 THRU CU050
RU007 -- CU051 THRU CU077
RU008 -- CU078 THRU CU093
RU009 -- CU094 THRU CU122
RU010 -- CU123 THRU CU138

Review Form # 96-080

Remedial Units for WP-420

Figure: 1-1

REPORT NO.: DOE/OR/21548-590		EXHIBIT NO.: E/CP/006/0196	
ORIGINATOR: EMD	DRAWN BY: WSSRAP	DATE: 01/96	



Review Form #96-080

N
W
E
S

10 5 0 METERS

30 15 0 FEET

Sample Locations in Remedial Unit RU008 Confirmation Unit CU091

Figure B-72

EXHIBIT NO.: A/CP/154/1295		REPORT NO.: DOE/OR/21548-590	
ORIGINATOR: MGL	DRAWN BY: WSSRAP GIS	DATE: 3/96	

CU091 DATA REPORT

NUMBER OF URANIUM-238 SAMPLES IN DATABASE FOR THIS CU IS: 32

PARAMETER	LOCATION	CONC	DL	UNITS
URANIUM-238	SC-09101-S	6.03	2.08	PCI/G
URANIUM-238	SC-09102-S	1.59	3.17	PCI/G
URANIUM-238	SC-09104-S	2.23	4.45	PCI/G
URANIUM-238	SC-09103-S	1.90	3.79	PCI/G
URANIUM-238	SC-09105-S	2.30	4.60	PCI/G
URANIUM-238	SC-09107-S	8.11	3.49	PCI/G
URANIUM-238	SC-09106-S	1.61	3.22	PCI/G
URANIUM-238	SC-09108-S	1.64	3.28	PCI/G
URANIUM-238	SC-09110-S	13.22	2.44	PCI/G
URANIUM-238	SC-09220-S	8.58	3.25	PCI/G
URANIUM-238	SC-09109-S	2.08	4.17	PCI/G
URANIUM-238	SC-09113-S	10.62	3.59	PCI/G
URANIUM-238	SC-09111-S	3.14	3.11	PCI/G
URANIUM-238	SC-09114-S	8.30	3.24	PCI/G
URANIUM-238	SC-09112-S	1.89	3.77	PCI/G
URANIUM-238	SC-09117-S	16.19	3.43	PCI/G
URANIUM-238	SC-09115-S	15.12	4.46	PCI/G
URANIUM-238	SC-09118-S	13.96	2.38	PCI/G
URANIUM-238	SC-09116-S	2.09	4.18	PCI/G
URANIUM-238	SC-09121-S	11.95	4.17	PCI/G
URANIUM-238	SC-09119-S	12.00	5.00	PCI/G
URANIUM-238	SC-09122-S	21.61	2.72	PCI/G
URANIUM-238	SC-09120-S	8.85	4.07	PCI/G
URANIUM-238	SC-09125-S	10.42	2.18	PCI/G
URANIUM-238	SC-09123-S	17.56	3.32	PCI/G
URANIUM-238	SC-09126-S	13.46	4.18	PCI/G
URANIUM-238	SC-09124-S	9.57	3.05	PCI/G
URANIUM-238	SC-09127-S	23.07	3.33	PCI/G
URANIUM-238	SC-09128-S	9.68	3.35	PCI/G
URANIUM-238	SC-09105-C	5.71	2.06	PCI/G
URANIUM-238	SC-09114-C	2.70	2.31	PCI/G
URANIUM-238	SC-09121-C	21.40	4.58	PCI/G

Average of URANIUM-238 values is 9.02 PCI/G, which is below ALARA, 30.00 PCI/G.
Maximum single value is 23.07 PCI/G, which is below criteria, 120.00 PCI/G.

Weldon Spring Site Remedial Action Project
7295 Highway 94 South, St. Charles, Missouri, 63304

ES&H 1.2.1.I, Rev. 1, 03/96

SOIL CONFIRMATION REMEDIATION DISPOSITION FORM

SECTION I

1. Work Package Number: WP 420 2. Date: 10/17/96 3. Review Form #: 96-082

4. Remediation Unit Number: RU008 5. Confirmation Unit Number: CU097 (map attached)

6. Contaminants of Concern: X U-238 X Th-230 ___ Th-232 X Ra-226 X Ra-228
___ TNT X PCB ___ PAH X As X Cr X Pb ___ Tl

7. Results average below ALARA goal(s)?	X Yes ___ No
8. All results below cleanup criteria?	X Yes ___ No
9. Any results greater than 3X criteria?	___ Yes X No
10. Hotspots present (less than 3X criteria)?	___ Yes X No

Parameter	Size	Concentration	Complies with Plan?
			___ Yes ___ No
			___ Yes ___ No
N/A			___ Yes ___ No
			___ Yes ___ No

11. Reviewer: Melissa A. Lutz Date: 10/17/96

12. Reviewer Disposition Recommendation:
X Release for Unrestricted Use (Section II)
___ Additional Excavation Required (Section IV)
___ ALARA Committee Required (Section III)

SECTION II *Results are ALARA. CU is released for unrestricted use.*

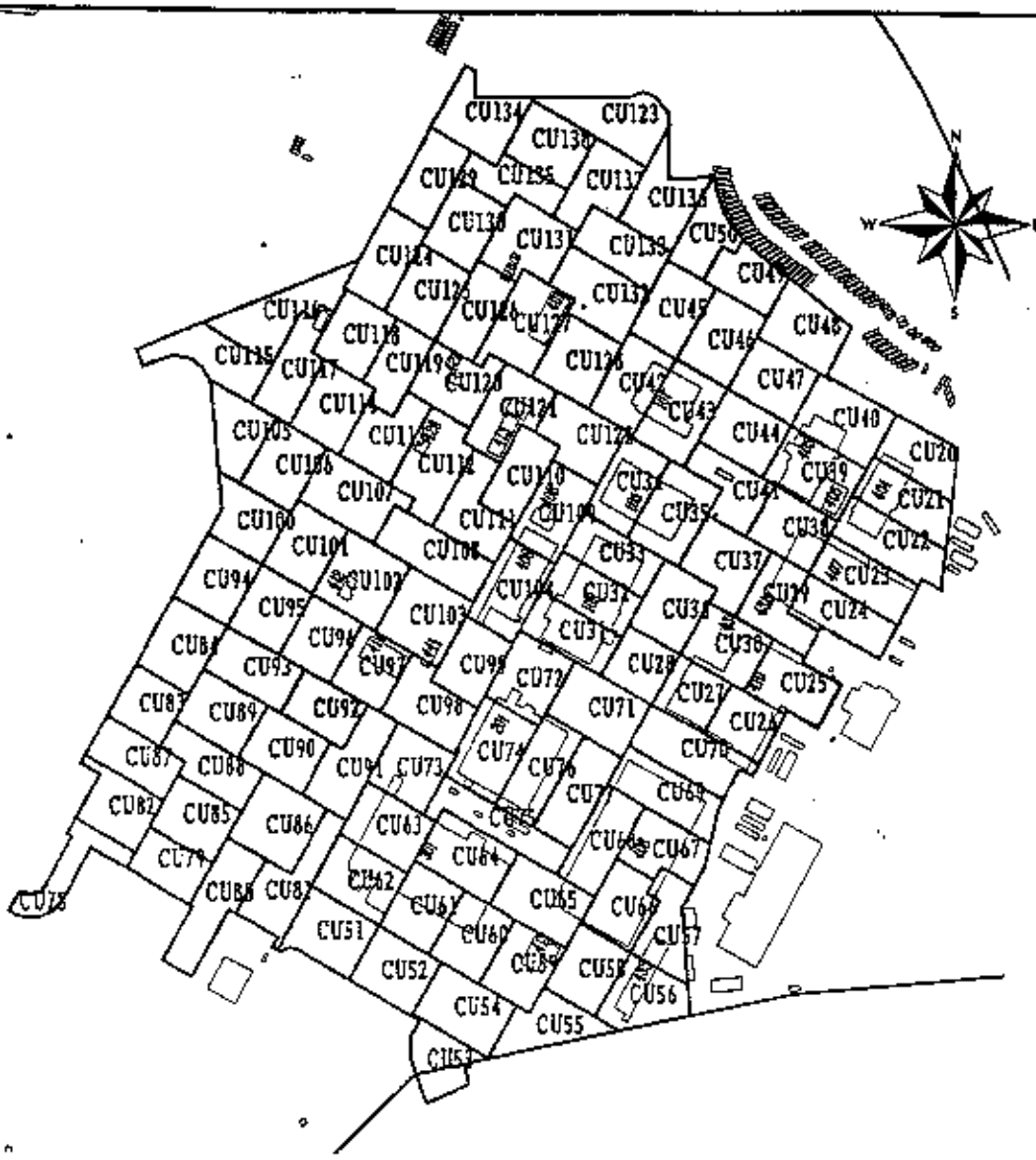
14. ES&H Manager: for Ken Date: 10/17/96

15. DOE Project Manager/Engineer: Date: 10/17/96

16. Project Manager: Thom Thym for Gary Beyer Date: 10/17/96

17. Construction Engineer: Daniel L. Copp Date: 10-17-96

SEE ATTACHED RESULTS AND MAP



LEGEND

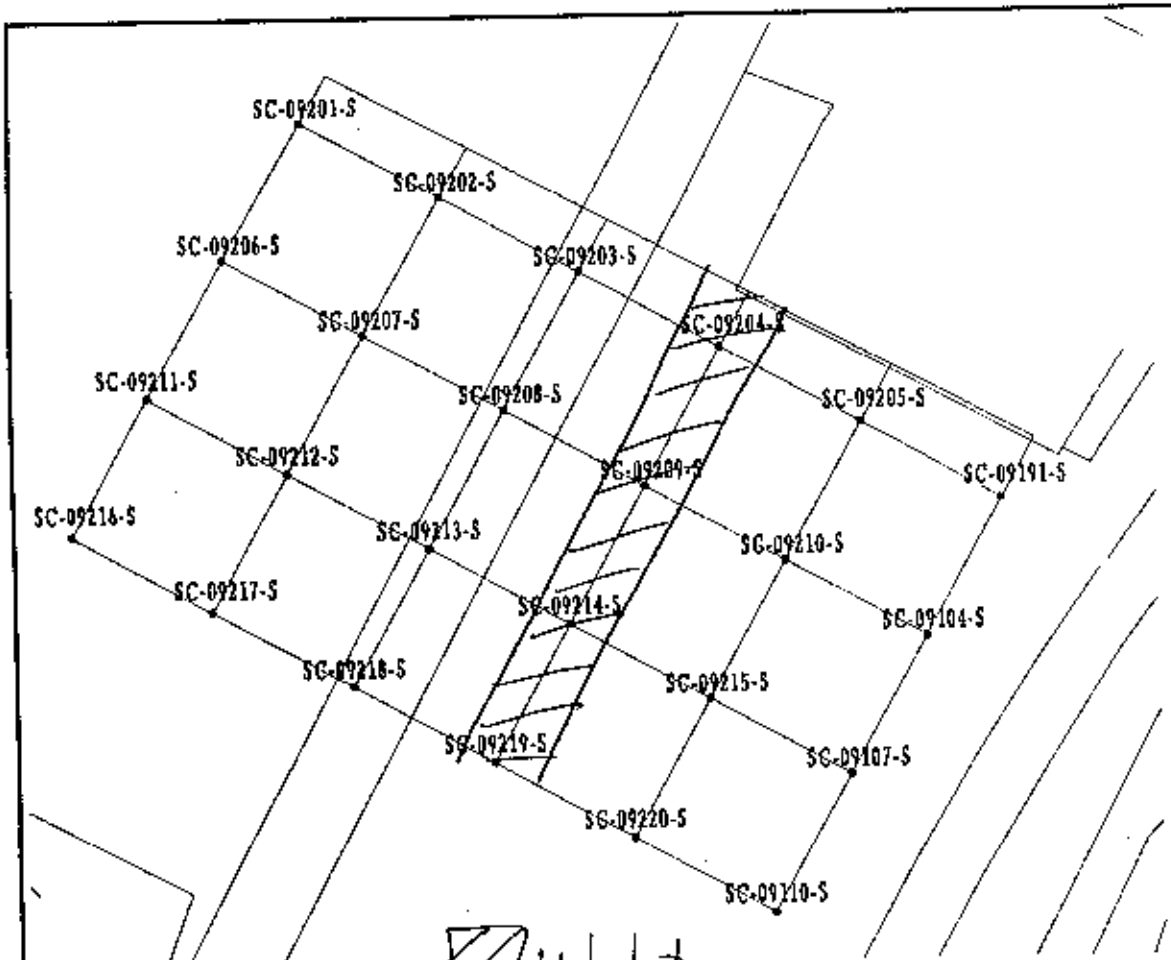
RU006 -- CU020 THRU CU050
RU007 -- CU051 THRU CU077
RU008 -- CU078 THRU CU093
RU009 -- CU094 THRU CU122
RU010 -- CU123 THRU CU138

Review Form # 96-082

Remedial Units for WP-420

Figure: 1-1

REPORT NO.: DOE/OR/21548-590		EXHIBIT NO.: E/CP/006/0196	
ORIGINATOR: EMD	DRAWN BY: WSSRAP	DATE: 01/96	



Review Form #96-082

Sample Locations in Remedial Unit RU008 Confirmation Unit CU092

Figure B-73

EXHIBIT NO.: A/CP/155/1295		REPORT NO.: DOE/OR/21548-590	
ORIGINATOR: MGL	DRAWN BY: WSSRAP GIS	DATE: 3/96	

CU092 DATA REPORT

URANIUM 238

NUMBER OF URANIUM-238 SAMPLES IN DATABASE FOR THIS CU IS: 24

PARAMETER	LOCATION	CONC	DL	UNITS
URANIUM-238	SC-09201-S	1.89	3.77	PCI/G
URANIUM-238	SC-09206-S	1.86	3.71	PCI/G
URANIUM-238	SC-09203-S	2.04	4.07	PCI/G
URANIUM-238	SC-09207-S	2.05	4.10	PCI/G
URANIUM-238	SC-09204-S	1.92	3.83	PCI/G
URANIUM-238	SC-09211-S	2.06	4.12	PCI/G
URANIUM-238	SC-09208-S	1.47	2.94	PCI/G
URANIUM-238	SC-09205-S	1.98	3.95	PCI/G
URANIUM-238	SC-09212-S	1.52	3.04	PCI/G
URANIUM-238	SC-09209-S	1.67	3.34	PCI/G
URANIUM-238	SC-09101-S	6.03	2.08	PCI/G
URANIUM-238	SC-09216-S	4.41	2.30	PCI/G
URANIUM-238	SC-09213-S	2.02	4.03	PCI/G
URANIUM-238	SC-09210-S	5.61	2.06	PCI/G
URANIUM-238	SC-09217-S	1.57	3.14	PCI/G
URANIUM-238	SC-09214-S	2.11	4.22	PCI/G
URANIUM-238	SC-09104-S	2.23	4.45	PCI/G
URANIUM-238	SC-09218-S	1.96	3.91	PCI/G
URANIUM-238	SC-09215-S	13.51	3.12	PCI/G
URANIUM-238	SC-09219-S	1.61	3.21	PCI/G
URANIUM-238	SC-09107-S	8.11	3.49	PCI/G
URANIUM-238	SC-09220-S	8.58	3.25	PCI/G
URANIUM-238	SC-09110-S	13.22	2.44	PCI/G
URANIUM-238	SC-09202-S	1.54	3.07	PCI/G

Average of URANIUM-238 values is 3.79 PCI/G, which is below ALARA, 30.00 PCI/G.
Maximum single value is 13.51 PCI/G, which is below criteria, 120.00 PCI/G.

THORIUM 230

NUMBER OF Thorium-230 SAMPLES IN DATABASE FOR THIS CU IS: 4

PARAMETER	LOCATION	CONC	DL	UNITS
Thorium-230	SC-09204-S	2.25	0.72	PCI/G
Thorium-230	SC-09209-S	1.62	0.72	PCI/G
Thorium-230	SC-09214-S	0.75	0.72	PCI/G
Thorium-230	SC-09219-S	0.98	0.72	PCI/G

Average of Thorium-230 values is 1.40 PCI/G, which is below ALARA, 5.00 PCI/G.

CU092 DATA REPORT (CONTINUED)

RADIUM 226

NUMBER OF RADIUM-226 SAMPLES IN DATABASE FOR THIS CU IS: 4

PARAMETER	LOCATION	CONC	DL	UNITS
RADIUM-226	SC-09204-S	2.59	0.27	PCI/G
RADIUM-226	SC-09209-S	2.66	0.33	PCI/G
RADIUM-226	SC-09214-S	2.13	0.45	PCI/G
RADIUM-226	SC-09219-S	2.38	0.32	PCI/G

Average of RADIUM-226 values is 2.44 PCI/G, which is below ALARA, 5.00 PCI/G.
Maximum single value is 2.66 PCI/G, which is below criteria, 6.20 PCI/G.

RADIUM 228

NUMBER OF RADIUM-228 SAMPLES IN DATABASE FOR THIS CU IS: 4

PARAMETER	LOCATION	CONC	DL	UNITS
RADIUM-228	SC-09204-S	1.31	0.53	PCI/G
RADIUM-228	SC-09209-S	1.58	0.43	PCI/G
RADIUM-228	SC-09214-S	1.53	0.52	PCI/G
RADIUM-228	SC-09219-S	1.17	0.35	PCI/G

Average of RADIUM-228 values is 1.40 PCI/G, which is below ALARA, 5.00 PCI/G.
Maximum single value is 1.58 PCI/G, which is below criteria, 6.20 PCI/G.

ARSENIC

NUMBER OF 'Arsenic' SAMPLES IN DATABASE FOR THIS CU IS: 4

PARAMETER	LOCATION	CONC	DL	UNITS
Arsenic	SC-09204-S	7.10	0.45	UG/G
Arsenic	SC-09209-S	10.20	0.44	UG/G
Arsenic	SC-09214-S	6.20	0.46	UG/G
Arsenic	SC-09219-S	16.90	0.42	UG/G

Average of Arsenic values is 10.10 UG/G, which is below ALARA, 45.00 UG/G.
Maximum single value is 16.90 UG/G, which is below criteria, 75 UG/G.

CU092 DATA REPORT (CONTINUED)

CHROMIUM

NUMBER OF Chromium SAMPLES IN DATABASE FOR THIS CU IS: 4

PARAMETER	LOCATION	CONC	DL	UNITS
Chromium	SC-09204-S	18.60	0.38	UG/G
Chromium	SC-09209-S	19.50	0.37	UG/G
Chromium	SC-09214-S	17.30	0.39	UG/G
Chromium	SC-09219-S	18.30	0.35	UG/G

Average of Chromium values is 18.43 UG/G, which is below ALARA, 90.00 UG/G.
Maximum single value is 19.50 UG/G, which is below criteria, 110.00 UG/G.

LEAD

NUMBER OF Lead SAMPLES IN DATABASE FOR THIS CU IS: 4

PARAMETER	LOCATION	CONC	DL	UNITS
Lead	SC-09204-S	13.90	0.20	UG/G
Lead	SC-09209-S	16.50	0.20	UG/G
Lead	SC-09214-S	14.10	0.21	UG/G
Lead	SC-09219-S	23.80	0.19	UG/G

Average of Lead values is 17.07 UG/G, which is below ALARA, 240.00 UG/G.
Maximum single value is 23.80 UG/G, which is below criteria, 450 UG/G.

PCBs

NUMBER OF PCB SAMPLES IN DATABASE FOR THIS CU IS: 4

PARAMETER	LOCATION	CONC	DL	UNITS
PCB	SC-09204-S	0	42	UG/KG
PCB	SC-09209-S	0	41	UG/KG
PCB	SC-09214-S	0	43	UG/KG
PCB	SC-09219-S	0	39	UG/KG

Average of PCB values is 0, which is below ALARA, 650
Maximum single value is 0, which is below criteria, 8000

Weldon Spring Site Remedial Action Project
7295 Highway 94 South, St. Charles, Missouri, 63304

ES&H 1.2.1.1, Rev. 1, 03/96

SOIL CONFIRMATION REMEDIATION DISPOSITION FORM

SECTION I

1. Work Package Number: WP420 2. Date: 09-17-96 3. Review Form #: 96-060

4. Remediation Unit Number: RU008 5. Confirmation Unit Number: CU093 (map attached)

6. Contaminants of Concern: X U-238 ____ Th-230 ____ Th-232 ____ Ra-226 ____ Ra-228
____ TNT ____ PCB ____ PAH ____ As ____ Cr ____ Pb ____ Tl

7. Results average below ALARA goal(s)?	X Yes ____ No
8. All results below cleanup criteria?	X Yes ____ No
9. Any results greater than 3X criteria?	____ Yes X No
10. Hotspots present (less than 3X criteria)?	____ Yes X No

Parameter	Size	Concentration	Complies with Plan?
N/A			____ Yes ____ No
			____ Yes ____ No
			____ Yes ____ No
			____ Yes ____ No

11. Reviewer: Mel A Lutz Date: 9/17/96

12. Reviewer Disposition Recommendation: X Release for Unrestricted Use (Section II)
____ Additional Excavation Required (Section IV)
____ ALARA Committee Required (Section III)

SECTION II *Results are ALARA. CU is released for unrestricted use.*

14. ES&H Manager: Date: 9/17/96

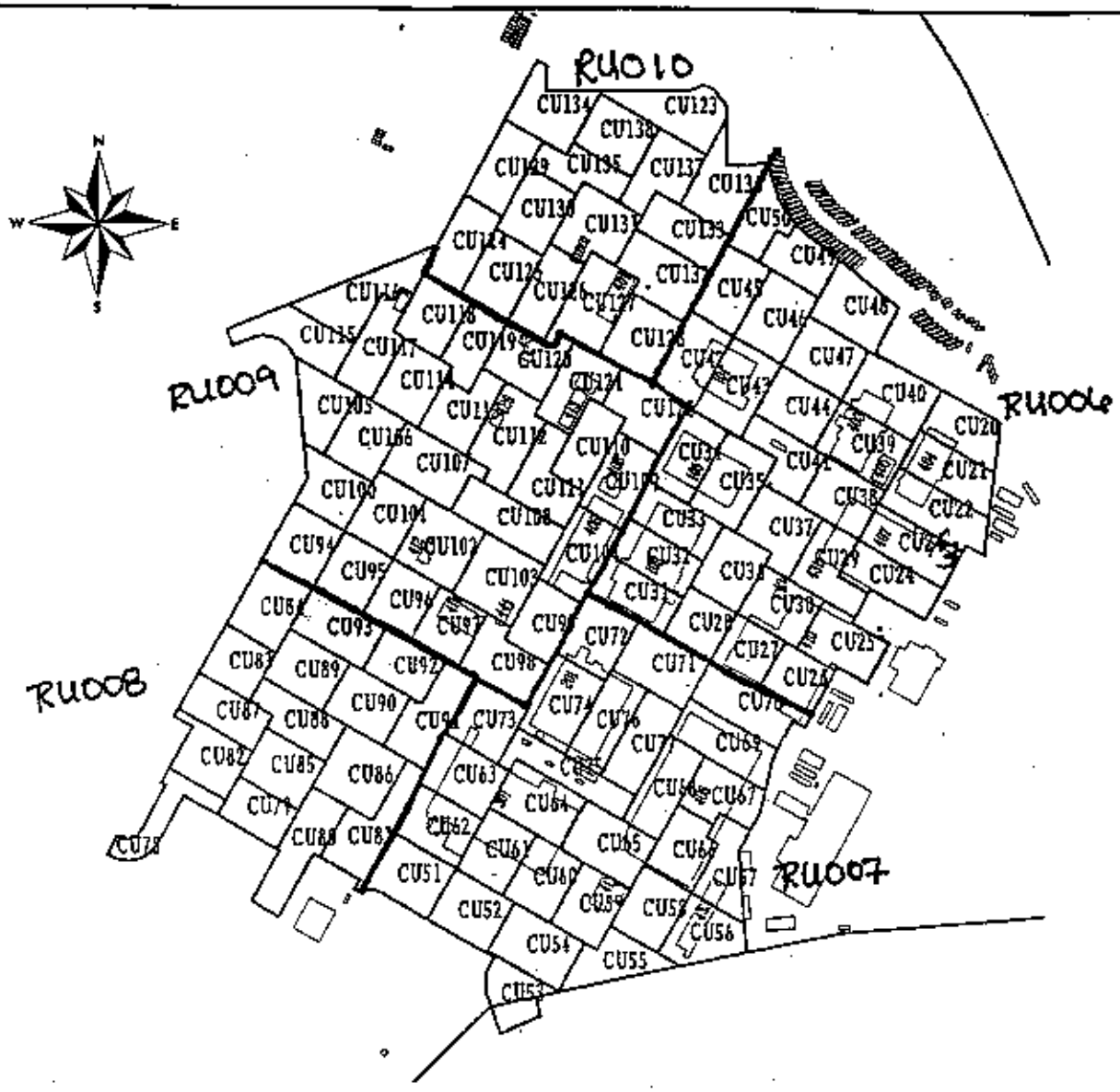
15. DOE Project Manager/Engineer: Date: 9/17/96

16. Project Manager: Date: 9/17/96

17. Construction Engineer: Daniel L. Cappe Date: 9/17/96

SEE ATTACHED RESULTS AND MAP

No utilities



LEGEND

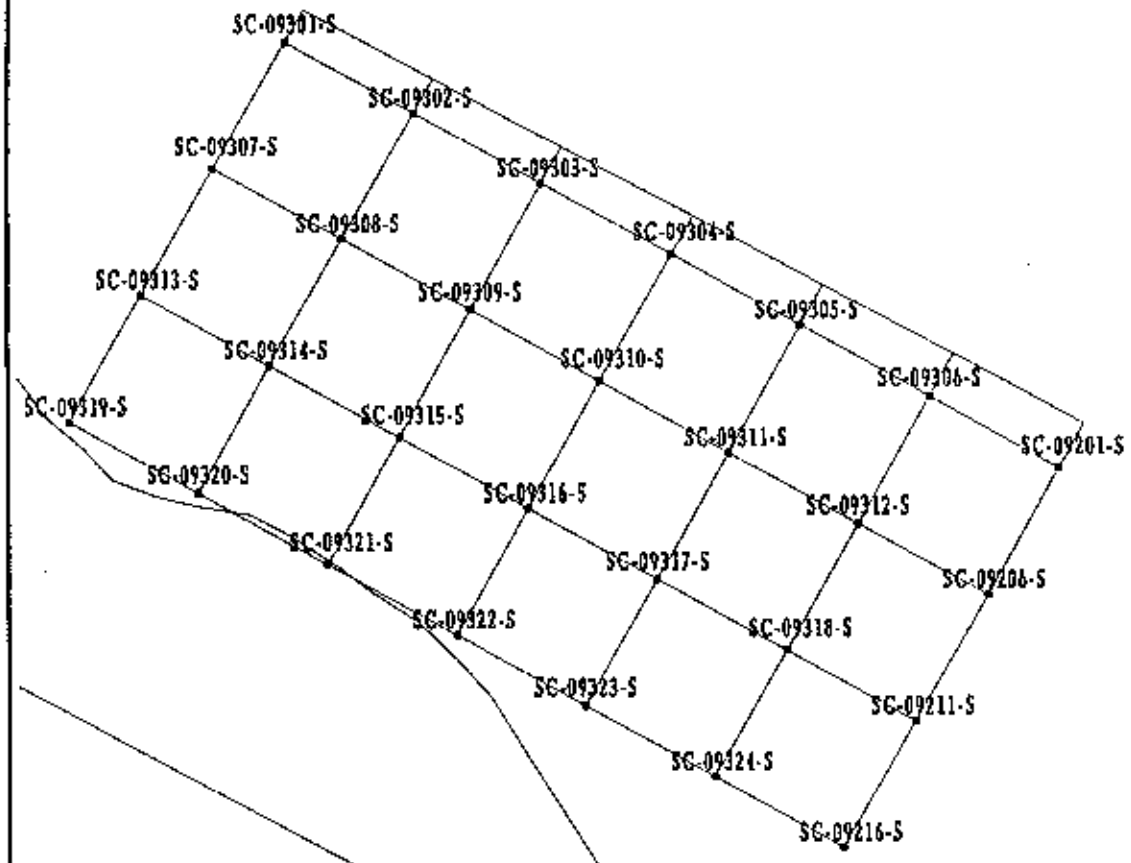
RU006 -- CU020 THRU CU050
RU007 -- CU051 THRU CU077
RU008 -- CU078 THRU CU093
RU009 -- CU094 THRU CU122
RU010 -- CU123 THRU CU138

Review Form# 96-060

Remedial Units for WP-420

Figure: 1-1

REPORT NO.: DOE/OR/21548-590	EXHIBIT NO.: E/CP/006/0196	
ORIGINATOR: EMD	DRAWN BY: WSSRAP GIS	DATE: 01/96



10 5 0 10 METERS

30 15 0 30 FEET

N
W E
S

Review Form # 96-060

Sample Locations in Remedial Unit RU008 Confirmation Unit CU093

Figure B-74

EXHIBIT NO.: A/CP/156/1295		REPORT NO.: DOE/OR/21548-590	
ORIGINATOR: MGL	DRAWN BY: WSSRAP GIS	DATE: 3/96	

CU093 DATA REPORT

PARAMETER	CONC	DL	LOCATION	UNITS
URANIUM-238 (28 SAMPLES)				
	1.605	3.210	SC-09301-S	PCI/G
	2.050	4.100	SC-09302-S	PCI/G
	1.800	3.600	SC-09303-S	PCI/G
	1.605	3.210	SC-09304-S	PCI/G
	2.095	4.190	SC-09305-S	PCI/G
	1.975	3.950	SC-09306-S	PCI/G
	2.145	4.290	SC-09307-S	PCI/G
	2.240	2.240	SC-09308-S	PCI/G
	1.605	3.200	SC-09309-S	PCI/G
	2.000	4.000	SC-09310-S	PCI/G
	1.520	3.040	SC-09311-S	PCI/G
	1.595	3.190	SC-09312-S	PCI/G
	6.210	3.520	SC-09313-S	PCI/G
	3.130	2.680	SC-09314-S	PCI/G
	2.240	4.480	SC-09315-S	PCI/G
	2.770	2.290	SC-09316-S	PCI/G
	1.600	3.200	SC-09317-S	PCI/G
	1.990	3.980	SC-09318-S	PCI/G
	1.710	3.420	SC-09319-S	PCI/G
	5.175	3.100	SC-09320-S	PCI/G
	2.485	4.970	SC-09321-S	PCI/G
	1.670	3.340	SC-09322-S	PCI/G
	2.265	4.530	SC-09323-S	PCI/G
	3.130	2.300	SC-09324-S	PCI/G
	1.885	3.770	SC-09201-S	PCI/G
	1.855	3.710	SC-09206-S	PCI/G
	2.060	4.120	SC-09211-S	PCI/G
	4.410	2.300	SC-09216-S	PCI/G

URANIUM-238 AVERAGE = 2.386 PCI/G

APPENDIX D

Analytical Data

APPENDIX D TABLE D-1

WSSRAP ID	PARAMETER	CONC	ERR	DL	UNITS	VAL QUAL	COMMENTS	METHOD	MATRIX	CATEGORY	DIL FACT	LAB ID	LAB QUAL	LAB REQU	DATE ANA	SAMPLINK	DATE SAMPLED
SC-08001-S	URANIUM-238	ND		4.47	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3823		WP0140.0	9/12/96	0000024965	9/11/96
SC-08002-S	URANIUM-238	ND		4.38	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4009		WP0155.0	10/6/96	0000024966	10/3/96
SC-08003-S	AROCLOR-1248	ND		38.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12372001	U	QT2005.0	10/7/96	0000024967	10/3/96
SC-08003-S	AROCLOR-1254	ND		38.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12372001	U	QT2005.0	10/7/96	0000024967	10/3/96
SC-08003-S	AROCLOR-1260	ND		38.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12372001	U	QT2005.0	10/7/96	0000024967	10/3/96
SC-08003-S	ARSENIC	8.30		0.42	UG/G	*		EPA CLP	SOIL	METALS	1.00	12372001		QT2005.0	10/6/96	0000024967	10/3/96
SC-08003-S	CHROMIUM	15.90		0.35	UG/G	*		EPA CLP	SOIL	METALS	1.00	12372001		QT2005.0	10/6/96	0000024967	10/3/96
SC-08003-S	LEAD	10.10		0.19	UG/G	*		EPA CLP	SOIL	METALS	1.00	12372001		QT2005.0	10/6/96	0000024967	10/3/96
SC-08003-S	RADIUM-226	1.50	0.13	0.32	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4010		WP0155.0	11/15/96	0000024967	10/3/96
SC-08003-S	RADIUM-228	1.52	0.19	0.15	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4010		WP0155.0	11/15/96	0000024967	10/3/96
SC-08003-S	THORIUM-230	1.15	0.14	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4010		WP0155.0	10/6/96	0000024967	10/3/96
SC-08003-S	URANIUM-238	4.47	1.23	3.28	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4010		WP0155.0	11/15/96	0000024967	10/3/96
SC-08004-S	URANIUM-238	2.35	0.69	2.61	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3824		WP0140.0	9/12/96	0000024968	9/11/96
SC-08004-S-RS01	RADIUM-226	1.87	0.14	0.32	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4359		WP0182.0	12/6/96	0000031605	10/25/96
SC-08004-S-RS01	RADIUM-228	1.75	0.20	0.87	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4359		WP0182.0	12/6/96	0000031605	10/25/96
SC-08004-S-RS01	URANIUM-238	25.50	3.16	5.77	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4359		WP0182.0	12/6/96	0000031605	10/25/96
SC-08005-S	URANIUM-238	ND		3.69	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4011		WP0155.0	10/6/96	0000024969	10/3/96
SC-08006-S	AROCLOR-1248	ND		38.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12372002	U	QT2005.0	10/7/96	0000024970	10/3/96
SC-08006-S	AROCLOR-1254	ND		38.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12372002	U	QT2005.0	10/7/96	0000024970	10/3/96
SC-08006-S	AROCLOR-1260	ND		38.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12372002	U	QT2005.0	10/7/96	0000024970	10/3/96
SC-08006-S	ARSENIC	7.30		0.41	UG/G	*		EPA CLP	SOIL	METALS	1.00	12372002		QT2005.0	10/6/96	0000024970	10/3/96
SC-08006-S	CHROMIUM	13.40		0.34	UG/G	*		EPA CLP	SOIL	METALS	1.00	12372002		QT2005.0	10/6/96	0000024970	10/3/96
SC-08006-S	LEAD	12.50		0.18	UG/G	*		EPA CLP	SOIL	METALS	1.00	12372002		QT2005.0	10/6/96	0000024970	10/3/96
SC-08006-S	RADIUM-226	1.35	0.10	0.32	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4012		WP0155.0	11/15/96	0000024970	10/3/96
SC-08006-S	RADIUM-228	1.02	0.13	0.37	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4012		WP0155.0	11/15/96	0000024970	10/3/96
SC-08006-S	THORIUM-230	1.13	0.12	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4012		WP0155.0	10/6/96	0000024970	10/3/96
SC-08006-S	URANIUM-238	3.09	0.83	3.05	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4012		WP0155.0	11/15/96	0000024970	10/3/96
SC-08007-C	THORIUM-230	1.05	0.11	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4275		WP0169.0	10/18/96	0000024971	10/16/96
SC-08007-C	URANIUM-238	ND		3.79	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4275		WP0169.0	10/17/96	0000024971	10/16/96
SC-08007-S	THORIUM-230	1.07	0.12	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4276		WP0169.0	10/18/96	0000024972	10/16/96
SC-08007-S	URANIUM-238	ND		3.08	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4276		WP0169.0	10/17/96	0000024972	10/16/96
SC-08008-S	URANIUM-238	ND		4.19	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4277		WP0169.0	10/17/96	0000024973	10/16/96
SC-08009-S	URANIUM-238	ND		2.85	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4278		WP0169.0	10/17/96	0000024974	10/16/96
SC-08101-S	URANIUM-238	16.20	2.31	4.54	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4038		WP0156.0	10/7/96	0000024997	10/4/96
SC-08102-S	URANIUM-238	15.60	1.97	4.24	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4039		WP0156.0	10/7/96	0000024998	10/4/96
SC-08103-C	URANIUM-238	11.70	1.55	2.45	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4040		WP0156.0	10/7/96	0000025001	10/4/96
SC-08103-S	URANIUM-238	6.38	1.45	3.53	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4041		WP0156.0	10/7/96	0000024999	10/4/96
SC-08104-S	URANIUM-238	7.77	1.16	3.02	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4042		WP0156.0	10/7/96	0000025000	10/4/96
SC-08105-S	URANIUM-238	191.00	15.10	11.60	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4043		WP0156.0	10/7/96	0000025002	10/4/96
SC-08105-S-RS	URANIUM-238	9.64	1.64	3.72	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4325		WP0173.0	10/18/96	0000030629	10/17/96
SC-08106-S	URANIUM-238	13.80	1.69	3.89	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4045		WP0156.0	10/7/96	0000025003	10/4/96
SC-08107-S	URANIUM-238	10.30	1.58	3.84	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4046		WP0156.0	10/7/96	0000025004	10/4/96
SC-08108-S	URANIUM-238	14.10	1.69	2.47	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4047		WP0156.0	10/7/96	0000025005	10/4/96
SC-08109-S	URANIUM-238	0.73	0.16	9.94	PCI/G	U	*T*	HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4048		WP0156.0	10/7/96	0000025006	10/4/96
SC-08110-S	URANIUM-238	13.10	2.12	4.11	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4049		WP0156.0	10/7/96	0000025007	10/4/96
SC-08111-S	URANIUM-238	9.13	1.46	3.20	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4013		WP0155.0	10/6/96	0000025008	10/3/96
SC-08112-S	URANIUM-238	7.44	1.12	2.74	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4050		WP0156.0	10/7/96	0000025009	10/4/96
SC-08113-S	URANIUM-238	3.72	1.11	3.06	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4051		WP0156.0	10/6/96	0000025010	10/4/96
SC-08114-C	RADIUM-226	1.38	0.12	0.31	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4052		WP0156.0	11/15/96	0000025011	10/4/96
SC-08114-C	RADIUM-228	ND		1.25	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4052		WP0156.0	11/15/96	0000025011	10/4/96
SC-08114-C	URANIUM-238	14.20	2.10	4.24	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4052		WP0156.0	11/15/96	0000025011	10/4/96

APPENDIX D TABLE D-1

WSSRAP ID	PARAMETER	CONC	ERR	DL	UNITS	VAL QUAL	COMMENTS	METHOD	MATRIX	CATEGORY	DIL FACT	LAB ID	LAB QUAL	LAB REQU	DATE ANA	SAMPLINK	DATE SAMPLED
SC-08114-S	URANIUM-238	12.80	2.04	4.92	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4053		WP0156.0	10/8/96	0000025012	10/4/96
SC-08115-S	URANIUM-238	7.31	1.08	2.81	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4014		WP0155.0	10/8/96	0000025013	10/3/96
SC-08116-S	URANIUM-238	5.07	1.02	3.74	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4054		WP0156.0	10/8/96	0000025014	10/4/96
SC-08117-S	URANIUM-238	ND		4.00	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4055		WP0156.0	10/8/96	0000025015	10/4/96
SC-08118-S	URANIUM-238	2.62	0.72	2.53	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4056		WP0156.0	10/8/96	0000025016	10/4/96
SC-08119-S	URANIUM-238	ND		4.61	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4279		WP0169.0	10/17/96	0000025017	10/16/96
SC-08120-C	URANIUM-238	ND		4.07	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4057		WP0156.0	10/8/96	0000025019	10/4/96
SC-08120-S	URANIUM-238	1.92	0.51	1.78	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4280		WP0169.0	10/17/96	0000025018	10/16/96
SC-08121-S	URANIUM-238	1.29	0.82	2.86	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4281		WP0169.0	10/17/96	0000025020	10/16/96
SC-08122-S	URANIUM-238	2.96	0.69	2.43	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4282		WP0169.0	10/17/96	0000025021	10/16/96
SC-08206-S	URANIUM-238	ND		4.46	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3854		WP0141.0	9/15/96	0000025028	9/12/96
SC-08207-S	URANIUM-238	ND		3.06	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3855		WP0141.0	9/15/96	0000025029	9/12/96
SC-08305-S	URANIUM-238	4.26	0.79	2.87	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3856		WP0141.0	9/15/96	0000025049	9/12/96
SC-08310-S	URANIUM-238	3.72	0.69	2.08	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3857		WP0141.0	9/15/96	0000025054	9/12/96
SC-08315-S	URANIUM-238	ND		4.53	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3858		WP0141.0	9/15/96	0000025058	9/12/96
SC-08320-S	URANIUM-238	5.21	1.17	2.69	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3859		WP0141.0	9/15/96	0000025062	9/12/96
SC-08401-U	RADIUM-226	1.59	0.13	0.34	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4404		WP0192.0	12/13/96	0000031740	11/3/96
SC-08401-U	RADIUM-228	ND		1.41	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4404		WP0192.0	12/13/96	0000031740	11/3/96
SC-08401-U	THORIUM-230	0.89	0.16	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4404		WP0192.0	11/7/96	0000031740	11/3/96
SC-08401-U	URANIUM-238	6.34	1.43	3.47	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4404		WP0192.0	12/13/96	0000031740	11/3/96
SC-08402-U	RADIUM-226	1.42	0.10	0.27	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4405		WP0192.0	12/13/96	0000031741	11/3/96
SC-08402-U	RADIUM-228	1.46	0.15	0.53	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4405		WP0192.0	12/13/96	0000031741	11/3/96
SC-08402-U	THORIUM-230	0.92	0.14	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4405		WP0192.0	11/7/93	0000031741	11/3/96
SC-08402-U	URANIUM-238	ND		3.23	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4405		WP0192.0	12/13/96	0000031741	11/3/96
SC-08403-S	URANIUM-238	3.33	0.75	2.66	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4015		WP0155.0	10/6/96	0000025064	10/3/96
SC-08403-U	RADIUM-226	1.57	0.13	0.40	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4406		WP0192.0	12/13/96	0000031742	11/3/96
SC-08403-U	RADIUM-228	1.42	0.19	0.58	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4406		WP0192.0	12/13/96	0000031742	11/3/96
SC-08403-U	THORIUM-230	1.07	0.16	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4406		WP0192.0	11/7/96	0000031742	11/3/96
SC-08403-U	URANIUM-238	ND		4.22	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4406		WP0192.0	12/13/96	0000031742	11/3/96
SC-08404-S	URANIUM-238	4.26	1.30	3.63	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4016		WP0155.0	10/8/96	0000025065	10/3/96
SC-08405-S	URANIUM-238	3.72	0.82	2.83	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4017		WP0155.0	10/8/96	0000025066	10/3/96
SC-08408-S	THORIUM-230	2.30	0.26	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4018		WP0155.0	10/8/96	0000025068	10/3/96
SC-08408-S	URANIUM-238	ND		4.53	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4018		WP0155.0	10/5/96	0000025068	10/3/96
SC-08409-S	THORIUM-230	1.77	0.21	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4019		WP0155.0	10/9/96	0000025069	10/3/96
SC-08409-S	URANIUM-238	ND		3.41	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4019		WP0155.0	10/5/96	0000025069	10/3/96
SC-08410-S	URANIUM-238	5.69	1.40	3.59	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4020		WP0155.0	10/9/96	0000025070	10/3/96
SC-08413-C	THORIUM-230	5.65	0.49	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4021		WP0155.0	10/8/96	0000025073	10/3/96
SC-08413-C	URANIUM-238	4.43	0.93	3.19	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4021		WP0156.0	10/5/96	0000025073	10/3/96
SC-08413-S	THORIUM-230	2.06	0.25	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4022		WP0155.0	10/6/96	0000025072	10/3/96
SC-08413-S	URANIUM-238	6.07	1.27	2.75	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4022		WP0155.0	10/5/96	0000025072	10/3/96
SC-08414-S	THORIUM-230	2.46	0.30	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4023		WP0155.0	10/6/96	0000025074	10/3/96
SC-08414-S	URANIUM-238	2.91	1.10	3.26	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4023		WP0155.0	10/5/96	0000025074	10/3/96
SC-08414-S-HS01	RADIUM-226	1.80	0.17	0.51	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4208		WP0163.0	11/19/96	0000030656	10/9/96
SC-08414-S-HS01	RADIUM-228	1.74	0.22	0.65	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4208		WP0163.0	11/19/96	0000030656	10/9/96
SC-08414-S-HS01	THORIUM-230	2.74	0.40	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4208		WP0163.0	10/17/96	0000030656	10/9/96
SC-08414-S-HS01	URANIUM-238	82.70	7.92	7.65	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4208		WP0163.0	11/19/96	0000030656	10/9/96
SC-08414-S-HS02	RADIUM-226	1.29	0.12	0.31	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4326		WP0173.0	11/26/96	0000030671	10/19/96
SC-08414-S-HS02	RADIUM-228	ND		1.21	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4326		WP0173.0	11/26/96	0000030671	10/19/96
SC-08414-S-HS02	THORIUM-230	1.01	0.11	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4326		WP0173.0	10/22/96	0000030671	10/19/96
SC-08414-S-HS02	URANIUM-238	ND		4.12	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4326		WP0173.0	11/26/96	0000030671	10/19/96
SC-08414-S-HS03	RADIUM-228	1.69	0.13	0.48	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4327		WP0173.0	11/26/96	0000030672	10/19/96

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WSSRAP ID	PARAMETER	CONC	ERR	DL	UNITS	VAL QUAL	COMMENTS	METHOD	MATRIX	CATEGORY	DIL FACT	LAB ID	LAB QUAL	LAB REQU	DATE ANA	SAMPLINK	DATE SAMPLED
SC-08414-S-HS03	RADIUM-228	4.20	0.25	0.84	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4327		WP0173.0	11/26/96	0000030872	10/19/96
SC-08414-S-HS03	THORIUM-230	3.76	0.32	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4327		WP0173.0	10/21/96	0000030872	10/19/96
SC-08414-S-HS03	URANIUM-238	98.60	8.38	7.17	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4327		WP0173.0	11/26/96	0000030872	10/19/96
SC-08414-S-HS04	RADIUM-226	1.36	0.12	0.34	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4328		WP0173.0	11/26/96	0000030873	10/19/96
SC-08414-S-HS04	RADIUM-228	1.42	0.19	0.56	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4328		WP0173.0	11/26/96	0000030873	10/19/96
SC-08414-S-HS04	THORIUM-230	1.12	0.12	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4328		WP0173.0	10/21/96	0000030873	10/19/96
SC-08414-S-HS04	URANIUM-238	ND		3.80	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4328		WP0173.0	11/26/96	0000030873	10/19/96
SC-08414-S-HS05	RADIUM-226	2.71	0.16	0.54	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4329		WP0173.0	11/26/96	0000030874	10/19/96
SC-08414-S-HS05	RADIUM-228	6.88	0.32	0.84	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4329		WP0173.0	11/26/96	0000030874	10/19/96
SC-08414-S-HS05	THORIUM-230	8.99	0.47	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4329		WP0173.0	10/21/96	0000030874	10/19/96
SC-08414-S-HS05	URANIUM-238	208.00	13.70	5.96	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4329		WP0173.0	11/26/96	0000030874	10/19/96
SC-08414-S-HS06	RADIUM-226	2.04	0.18	0.60	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4346		WP0180.0	12/6/96	0000031566	10/28/96
SC-08414-S-HS06	RADIUM-228	5.63	0.38	1.24	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4346		WP0180.0	12/6/96	0000031566	10/28/96
SC-08414-S-HS06	THORIUM-230	6.18	0.47	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4346		WP0180.0	10/31/96	0000031566	10/28/96
SC-08414-S-HS06	URANIUM-238	72.30	7.42	8.30	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4346		WP0180.0	12/6/96	0000031566	10/28/96
SC-08414-S-HS07	RADIUM-226	3.22	0.17	0.65	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4347		WP0180.0	12/6/96	0000031569	10/28/96
SC-08414-S-HS07	RADIUM-228	4.18	0.27	0.93	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4347		WP0180.0	12/6/96	0000031569	10/28/96
SC-08414-S-HS07	THORIUM-230	13.60	0.70	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4347		WP0180.0	10/31/96	0000031569	10/28/96
SC-08414-S-HS07	URANIUM-238	243.00	26.00	10.20	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4347		WP0180.0	12/6/96	0000031569	10/28/96
SC-08414-S-HS08	RADIUM-226	5.83	0.22	0.69	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4348		WP0180.0	12/6/96	0000031570	10/28/96
SC-08414-S-HS08	RADIUM-228	2.12	0.21	0.81	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4348		WP0180.0	12/6/96	0000031570	10/28/96
SC-08414-S-HS08	THORIUM-230	9.05	0.53	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4348		WP0180.0	10/31/96	0000031570	10/28/96
SC-08414-S-HS08	URANIUM-238	408.00	23.10	10.80	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4348		WP0180.0	12/6/96	0000031570	10/28/96
SC-08415-S	URANIUM-238	ND		3.34	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4024		WP0155.0	10/8/96	0000025075	10/3/96
SC-08418-S	THORIUM-230	2.21	0.25	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4025		WP0155.0	10/6/96	0000025077	10/3/96
SC-08418-S	URANIUM-238	2.44	0.65	2.39	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4025		WP0155.0	10/5/96	0000025077	10/3/96
SC-08419-S	THORIUM-230	1.48	0.17	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4026		WP0155.0	10/6/96	0000025078	10/3/96
SC-08419-S	URANIUM-238	ND		3.33	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4026		WP0155.0	10/5/96	0000025078	10/3/96
SC-08419-S-HS01	RADIUM-226	2.95	0.20	0.74	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4209		WP0163.0	11/19/96	0000030857	10/9/96
SC-08419-S-HS01	RADIUM-228	2.14	0.29	1.34	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4209		WP0163.0	11/19/96	0000030857	10/9/96
SC-08419-S-HS01	THORIUM-230	8.28	0.70	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4209		WP0163.0	10/17/96	0000030857	10/9/96
SC-08419-S-HS01	URANIUM-238	1010.00	44.00	15.00	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4209		WP0163.0	11/19/96	0000030857	10/9/96
SC-08420-S	URANIUM-238	ND		4.38	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4027		WP0155.0	10/6/96	0000025079	10/3/96
SC-08423-S	THORIUM-230	2.27	0.29	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4028		WP0155.0	10/6/96	0000025081	10/3/96
SC-08423-S	URANIUM-238	2.47	0.65	2.39	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4028		WP0155.0	10/6/96	0000025081	10/3/96
SC-08424-S	URANIUM-238	ND		3.83	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4029		WP0155.0	10/6/96	0000025082	10/3/96
SC-08425-S	URANIUM-238	ND		4.66	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4030		WP0155.0	10/6/96	0000025083	10/3/96
SC-08428-S	THORIUM-230	1.12	0.15	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4031		WP0155.0	10/6/96	0000025085	10/3/96
SC-08428-S	THORIUM-230	2.15	0.28	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4032		WP0155.0	10/6/96	0000025086	10/3/96
SC-08428-S	URANIUM-238	ND		4.01	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4032		WP0155.0	10/5/96	0000025086	10/3/96
SC-08429-S	URANIUM-238	2.07	0.70	2.75	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4034		WP0155.0	10/6/96	0000025087	10/3/96
SC-08430-S	URANIUM-238	4.72	0.83	2.64	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3660		WP0141.0	9/15/96	0000025088	9/12/96
SC-08501-S	URANIUM-238	2.19	1.20	3.80	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3625		WP0140.0	9/12/96	0000025089	9/11/96
SC-08502-S	URANIUM-238	2.85	0.74	2.60	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3626		WP0140.0	9/12/96	0000025090	9/11/96
SC-08503-S	URANIUM-238	4.65	1.08	3.10	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3627		WP0140.0	9/12/96	0000025091	9/11/96
SC-08504-S	URANIUM-238	4.22	0.81	2.42	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3628		WP0140.0	9/12/96	0000025092	9/11/96
SC-08505-S	URANIUM-238	3.47	1.02	2.76	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3629		WP0140.0	9/12/96	0000025093	9/11/96
SC-08506-S	URANIUM-238	3.66	0.74	2.33	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3630		WP0140.0	9/12/96	0000025094	9/11/96
SC-08507-S	URANIUM-238	ND		4.17	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3631		WP0140.0	9/12/96	0000025095	9/11/96
SC-08508-S	URANIUM-238	4.10	0.85	2.86	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3632		WP0140.0	9/12/96	0000025096	9/11/96
SC-08509-S	URANIUM-238	ND		4.48	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3633		WP0140.0	9/12/96	0000025097	9/11/96

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WS&RAP ID	PARAMETER	CONC	ERR	DL	UNITS	VAL QUAL	COMMENTS	METHOD	MATRIX	CATEGORY	DIL FACT	LAB ID	LAB QUAL	LAB REQU	DATE ANA	SAMPLINK	DATE SAMPLED
SC-08510-S	URANIUM-238	5.12	1.21	2.94	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3634		WP0140.0	9/12/96	0000025098	9/11/96
SC-08511-S	URANIUM-238	2.29	0.89	2.72	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3635		WP0140.0	9/12/96	0000025099	9/11/96
SC-08512-S	URANIUM-238	ND		4.38	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3636		WP0140.0	9/12/96	0000025100	9/11/96
SC-08513-S	URANIUM-238	3.03	0.89	2.54	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3637		WP0140.0	9/12/96	0000025101	9/11/96
SC-08514-S	URANIUM-238	ND		4.06	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3638		WP0140.0	9/12/96	0000025102	9/11/96
SC-08515-S	URANIUM-238	3.16	0.80	2.96	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3639		WP0140.0	9/12/96	0000025103	9/11/96
SC-08516-S	URANIUM-238	ND		4.37	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3640		WP0140.0	9/12/96	0000025104	9/11/96
SC-08517-S	URANIUM-238	ND		3.31	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3641		WP0140.0	9/12/96	0000025105	9/11/96
SC-08518-S	URANIUM-238	ND		4.25	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3643		WP0140.0	9/12/96	0000025106	9/11/96
SC-08519-S	URANIUM-238	3.18	0.73	2.36	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3644		WP0140.0	9/12/96	0000025107	9/11/96
SC-08520-S	URANIUM-238	8.32	1.53	3.90	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3645		WP0140.0	9/12/96	0000025108	9/11/96
SC-08601-S	URANIUM-238	2.59	1.32	4.18	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3661		WP0141.0	9/13/96	0000025109	9/12/96
SC-08602-S	URANIUM-238	ND		3.09	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4058		WP0156.0	10/8/96	0000025110	10/4/96
SC-08603-S	AROCLOR-1248	ND		39.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411001	U	QT2007.0	10/8/96	0000025111	10/4/96
SC-08603-S	AROCLOR-1254	ND		39.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411001	U	QT2007.0	10/8/96	0000025111	10/4/96
SC-08603-S	AROCLOR-1260	ND		39.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411001	U	QT2007.0	10/8/96	0000025111	10/4/96
SC-08603-S	ARSENIC	5.90		0.42	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411001		QT2007.0	10/8/96	0000025111	10/4/96
SC-08603-S	CHROMIUM	13.20		0.35	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411001		QT2007.0	10/8/96	0000025111	10/4/96
SC-08603-S	LEAD	10.90		0.19	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411001		QT2007.0	10/8/96	0000025111	10/4/96
SC-08603-S	RADIUM-226	1.55	0.11	0.27	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4059		WP0156.0	11/15/96	0000025111	10/4/96
SC-08603-S	RADIUM-228	1.47	0.14	0.41	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4059		WP0156.0	11/15/96	0000025111	10/4/96
SC-08603-S	THORIUM-230	0.91	0.10	0.72	PCI/G	A		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4059		WP0156.0	10/8/96	0000025111	10/4/96
SC-08603-S	URANIUM-238	ND		3.27	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4058		WP0156.0	11/15/96	0000025111	10/4/96
SC-08604-S	AROCLOR-1248	ND		75.00	UG/KG	U	DF=2	EPA 8080A	SOIL	PEST/PCBS	2.00	12411010	U	QT2007.0	10/8/96	0000025112	10/4/96
SC-08604-S	AROCLOR-1254	1700.00		75.00	UG/KG	A	DF=2	EPA 8080A	SOIL	PEST/PCBS	2.00	12411010		QT2007.0	10/9/96	0000025112	10/4/96
SC-08604-S	AROCLOR-1260	ND		75.00	UG/KG	U	DF=2	EPA 8080A	SOIL	PEST/PCBS	2.00	12411010	U	QT2007.0	10/9/96	0000025112	10/4/96
SC-08604-S	URANIUM-238	22.20	2.44	4.06	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4060		WP0156.0	10/8/96	0000025112	10/4/96
SC-08605-S	AROCLOR-1248	ND		390.00	UG/KG	U	DF=10	EPA 8080A	SOIL	PEST/PCBS	10.00	12411011	U	QT2007.0	10/9/96	0000025113	10/4/96
SC-08605-S	AROCLOR-1254	5800.00		390.00	UG/KG	A	DF=10	EPA 8080A	SOIL	PEST/PCBS	10.00	12411011		QT2007.0	10/9/96	0000025113	10/4/96
SC-08605-S	AROCLOR-1260	ND		390.00	UG/KG	U	DF=10	EPA 8080A	SOIL	PEST/PCBS	10.00	12411011	U	QT2007.0	10/9/96	0000025113	10/4/96
SC-08605-S	URANIUM-238	14.70	2.16	4.59	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4061		WP0156.0	10/7/96	0000025113	10/4/96
SC-08606-S	URANIUM-238	ND		4.47	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3662		WP0141.0	9/15/96	0000025114	9/12/96
SC-08607-S	URANIUM-238	4.16	1.13	2.96	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4062		WP0156.0	10/8/96	0000025115	10/4/96
SC-08608-S	AROCLOR-1248	ND		40.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411002	U	QT2007.0	10/8/96	0000025116	10/4/96
SC-08608-S	AROCLOR-1254	ND		40.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411002	U	QT2007.0	10/8/96	0000025116	10/4/96
SC-08608-S	AROCLOR-1260	ND		40.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411002	U	QT2007.0	10/8/96	0000025116	10/4/96
SC-08608-S	ARSENIC	5.40		0.43	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411002		QT2007.0	10/8/96	0000025116	10/4/96
SC-08608-S	CHROMIUM	14.80		0.36	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411002		QT2007.0	10/8/96	0000025116	10/4/96
SC-08608-S	LEAD	12.10		0.19	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411002		QT2007.0	10/8/96	0000025116	10/4/96
SC-08608-S	RADIUM-226	1.30	0.13	0.36	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4063		WP0156.0	11/15/96	0000025116	10/4/96
SC-08608-S	RADIUM-228	ND		1.43	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4063		WP0156.0	11/15/96	0000025116	10/4/96
SC-08608-S	THORIUM-230	1.14	0.14	0.72	PCI/G	A		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4063		WP0156.0	10/9/96	0000025116	10/4/96
SC-08608-S	URANIUM-238	ND		4.53	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4063		WP0156.0	11/15/96	0000025116	10/4/96
SC-08609-C	AROCLOR-1248	ND		77.00	UG/KG	U	DF=2	EPA 8080A	SOIL	PEST/PCBS	2.00	12411012	U	QT2007.0	10/9/96	0000025118	10/4/96
SC-08609-C	AROCLOR-1254	1600.00		77.00	UG/KG	A	DF=2	EPA 8080A	SOIL	PEST/PCBS	2.00	12411012		QT2007.0	10/9/96	0000025118	10/4/96
SC-08609-C	AROCLOR-1260	ND		77.00	UG/KG	U	DF=2	EPA 8080A	SOIL	PEST/PCBS	2.00	12411012	U	QT2007.0	10/9/96	0000025118	10/4/96
SC-08609-S	AROCLOR-1248	ND		38.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411013	U	QT2007.0	10/9/96	0000025117	10/4/96
SC-08609-S	AROCLOR-1254	740.00		38.00	UG/KG	A		EPA 8080A	SOIL	PEST/PCBS	1.00	12411013		QT2007.0	10/9/96	0000025117	10/4/96
SC-08609-S	AROCLOR-1260	ND		38.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411013	U	QT2007.0	10/9/96	0000025117	10/4/96
SC-08609-S	URANIUM-238	15.40	1.88	2.26	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4064		WP0156.0	10/8/96	0000025117	10/4/96
SC-08610-S	AROCLOR-1248	ND		72.00	UG/KG	U	DF=2	EPA 8080A	SOIL	PEST/PCBS	2.00	12411014	U	QT2007.0	10/9/96	0000025119	10/4/96

APPENDIX D TABLE D-1

WSSRAP ID	PARAMETER	CONC	ERR	DL	UNITS	VAL. QUAL	COMMENTS	METHOD	MATRIX	CATEGORY	DIL FACT	LAB ID	LAB QUAL	LAB REQU	DATE ANA	SAMPLINK	DATE SAMPLED
SC-08610-S	AROCLOR-1254	1400.00		72.00	UG/KG	A	DF=2	EPA 8080A	SOIL	PEST/PCBS	2.00	12411014		QT2007.0	10/8/96	0000025119	10/4/96
SC-08610-S	AROCLOR-1260	ND		72.00	UG/KG	U	DF=2	EPA 8080A	SOIL	PEST/PCBS	2.00	12411014	U	QT2007.0	10/8/96	0000025119	10/4/96
SC-08610-S	URANIUM-238	16.60	2.37	5.07	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4065		WP0156.0	10/8/96	0000025119	10/4/96
SC-08611-S	URANIUM-238	3.87	0.77	2.61	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3646		WP0140.0	9/12/96	0000025120	9/11/96
SC-08612-S	URANIUM-238	4.25	1.15	3.02	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4067		WP0156.0	10/8/96	0000025256	10/4/96
SC-08613-S	AROCLOR-1248	ND		38.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411003	U	QT2007.0	10/8/96	0000025257	10/4/96
SC-08613-S	AROCLOR-1254	180.00		38.00	UG/KG	N		EPA 8080A	SOIL	PEST/PCBS	1.00	12411003		QT2007.0	10/8/96	0000025257	10/4/96
SC-08613-S	AROCLOR-1260	ND		38.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411003	U	QT2007.0	10/8/96	0000025257	10/4/96
SC-08613-S	ARSENIC	7.30		0.42	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411003		QT2007.0	10/8/96	0000025257	10/4/96
SC-08613-S	CHROMIUM	14.50		0.35	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411003		QT2007.0	10/8/96	0000025257	10/4/96
SC-08613-S	LEAD	14.80		0.19	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411003		QT2007.0	10/8/96	0000025257	10/4/96
SC-08613-S	RADIUM-226	1.57	0.11	0.22	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4068		WP0158.0	11/15/96	0000025257	10/4/96
SC-08613-S	RADIUM-228	1.16	0.13	0.35	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4068		WP0158.0	11/15/96	0000025257	10/4/96
SC-08613-S	THORIUM-230	1.05	0.12	0.72	PCI/G	A		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4068		WP0156.0	10/9/96	0000025257	10/4/96
SC-08613-S	URANIUM-238	9.86	1.37	2.91	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4068		WP0158.0	11/15/96	0000025257	10/4/96
SC-08614-S	URANIUM-238	12.80	1.97	3.81	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4069		WP0156.0	10/7/96	0000025258	10/4/96
SC-08615-S	URANIUM-238	4.43	1.42	4.08	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4070		WP0156.0	10/8/96	0000025259	10/4/96
SC-08616-S	URANIUM-238	2.82	1.22	3.76	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3647		WP0140.0	9/12/96	0000025260	9/11/96
SC-08617-S	URANIUM-238	ND		3.25	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4071		WP0158.0	10/8/96	0000025261	10/4/96
SC-08618-S	AROCLOR-1248	ND		39.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411004	U	QT2007.0	10/8/96	0000025262	10/4/96
SC-08618-S	AROCLOR-1254	ND		39.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411004	U	QT2007.0	10/8/96	0000025262	10/4/96
SC-08618-S	AROCLOR-1260	ND		39.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411004	U	QT2007.0	10/8/96	0000025262	10/4/96
SC-08618-S	ARSENIC	6.10		0.43	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411004		QT2007.0	10/8/96	0000025262	10/4/96
SC-08618-S	CHROMIUM	12.40		0.38	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411004		QT2007.0	10/8/96	0000025262	10/4/96
SC-08618-S	LEAD	10.60		0.19	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411004		QT2007.0	10/8/96	0000025262	10/4/96
SC-08618-S	RADIUM-226	1.44	0.12	0.28	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4072		WP0158.0	11/17/96	0000025262	10/4/96
SC-08618-S	RADIUM-228	1.49	0.19	0.67	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4072		WP0158.0	11/17/96	0000025262	10/4/96
SC-08618-S	THORIUM-230	0.92	0.10	0.72	PCI/G	A		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4072		WP0156.0	10/9/96	0000025262	10/4/96
SC-08618-S	URANIUM-238	ND		4.98	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4072		WP0158.0	11/17/96	0000025262	10/4/96
SC-08619-S	URANIUM-238	10.10	1.41	3.20	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4073		WP0156.0	10/8/96	0000025263	10/4/96
SC-08620-S	URANIUM-238	7.71	1.37	3.15	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4074		WP0156.0	10/8/96	0000025264	10/4/96
SC-08621-S	URANIUM-238	7.45	1.17	3.17	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3648		WP0140.0	9/12/96	0000025265	9/11/96
SC-08622-S	URANIUM-238	ND		3.95	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4035		WP0155.0	10/8/96	0000025266	10/3/96
SC-08623-S	AROCLOR-1248	ND		42.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12372003	U	QT2005.0	10/7/96	0000025267	10/3/96
SC-08623-S	AROCLOR-1254	190.00		42.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12372003		QT2005.0	10/7/96	0000025267	10/3/96
SC-08623-S	AROCLOR-1260	86.00		42.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12372003		QT2005.0	10/7/96	0000025267	10/3/96
SC-08623-S	ARSENIC	34.10		0.45	UG/G	*		EPA CLP	SOIL	METALS	1.00	12372003		QT2005.0	10/8/96	0000025267	10/3/96
SC-08623-S	CHROMIUM	16.70		0.38	UG/G	*		EPA CLP	SOIL	METALS	1.00	12372003		QT2005.0	10/8/96	0000025267	10/3/96
SC-08623-S	LEAD	18.50		0.20	UG/G	*		EPA CLP	SOIL	METALS	1.00	12372003		QT2005.0	10/8/96	0000025267	10/3/96
SC-08623-S	RADIUM-226	1.41	0.13	0.41	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4036		WP0155.0	11/17/96	0000025267	10/3/96
SC-08623-S	RADIUM-228	ND		1.26	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4036		WP0155.0	11/17/96	0000025267	10/3/96
SC-08623-S	THORIUM-230	1.39	0.14	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4036		WP0155.0	10/8/96	0000025267	10/3/96
SC-08623-S	URANIUM-238	2.85	1.24	3.98	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4036		WP0155.0	11/17/96	0000025267	10/3/96
SC-08624-S	URANIUM-238	15.60	1.97	3.41	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4037		WP0155.0	10/8/96	0000025268	10/3/96
SC-08625-S	URANIUM-238	17.80	2.47	4.79	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4075		WP0158.0	10/8/96	0000025269	10/4/96
SC-08705-S	URANIUM-238	3.22	0.58	1.84	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3663		WP0141.0	9/15/96	0000025273	9/12/96
SC-08706-S	URANIUM-238	ND		4.19	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3664		WP0141.0	9/15/96	0000025274	9/12/96
SC-08707-S	URANIUM-238	ND		3.34	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3665		WP0141.0	9/15/96	0000025275	9/12/96
SC-08712-S	URANIUM-238	ND		4.62	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3666		WP0141.0	9/15/96	0000025278	9/12/96
SC-08713-S	URANIUM-238	ND		3.34	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3667		WP0141.0	9/15/96	0000025280	9/12/96
SC-08714-S	URANIUM-238	ND		3.89	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3669		WP0141.0	9/15/96	0000025281	9/12/96

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WSSRAP ID	PARAMETER	CONC	ERR	DL	UNITS	VAL QUAL	COMMENTS	METHOD	MATRIX	CATEGORY	DIL FACT	LAB ID	LAB QUAL	LAB REQU	DATE ANA	SAMPLINK	DATE SAMPLED
SC-08719-S	URANIUM-238	2.23	0.88	2.42	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3670		WP0141.0	9/15/96	000025285	9/12/96
SC-08720-S	URANIUM-238	ND		4.04	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3671		WP0141.0	9/15/96	000025286	9/12/96
SC-08721-S	URANIUM-238	ND		3.04	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3672		WP0141.0	9/15/96	000025287	9/12/96
SC-08801-S	URANIUM-238	ND		4.05	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3673		WP0141.0	9/15/96	000025288	9/12/96
SC-08802-S	URANIUM-238	ND		3.45	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3674		WP0141.0	9/15/96	000025289	9/12/96
SC-08803-S	URANIUM-238	ND		4.26	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3675		WP0141.0	9/13/96	000025290	9/12/96
SC-08804-S	URANIUM-238	2.85	1.04	3.12	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3676		WP0141.0	9/15/96	000025291	9/12/96
SC-08805-S	URANIUM-238	ND		3.22	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3677		WP0141.0	9/13/96	000025292	9/12/96
SC-08806-S	URANIUM-238	3.48	0.74	1.82	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3678		WP0141.0	9/15/96	000025293	9/12/96
SC-08807-S	URANIUM-238	3.85	0.86	3.14	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3679		WP0141.0	9/15/96	000025294	9/12/96
SC-08808-S	URANIUM-238	ND		3.85	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3680		WP0141.0	9/15/96	000025295	9/12/96
SC-08809-S	URANIUM-238	ND		4.59	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3681		WP0141.0	9/13/96	000025296	9/12/96
SC-08810-S	URANIUM-238	3.01	0.62	1.68	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3682		WP0141.0	9/13/96	000025297	9/12/96
SC-08811-S	URANIUM-238	4.21	0.81	2.53	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3683		WP0141.0	9/15/96	000025298	9/12/96
SC-08812-S	URANIUM-238	ND		4.21	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3684		WP0141.0	9/13/96	000025299	9/12/96
SC-08813-S	URANIUM-238	ND		4.03	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3685		WP0141.0	9/15/96	000025300	9/12/96
SC-08814-S	URANIUM-238	ND		3.35	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3687		WP0141.0	9/13/96	000025301	9/12/96
SC-08815-S	URANIUM-238	ND		4.22	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3649		WP0140.0	9/12/96	000025302	9/11/96
SC-08816-S	URANIUM-238	3.49	0.81	3.06	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3650		WP0140.0	9/12/96	000025303	9/11/96
SC-08817-S	URANIUM-238	ND		4.27	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3651		WP0140.0	9/12/96	000025304	9/11/96
SC-08818-S	URANIUM-238	2.79	0.79	2.92	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3652		WP0140.0	9/12/96	000025305	9/11/96
SC-08819-S	URANIUM-238	1.83	0.77	2.30	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3653		WP0140.0	9/12/96	000025306	9/11/96
SC-08901-S	URANIUM-238	ND		4.27	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3688		WP0141.0	9/15/96	000025307	9/12/96
SC-08901-U	RADIUM-226	1.81	0.10	0.25	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4407		WP0192.0	12/13/96	000031743	11/3/96
SC-08901-U	RADIUM-228	1.09	0.13	0.45	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4407		WP0192.0	12/13/96	000031743	11/3/96
SC-08901-U	THORIUM-230	1.08	0.14	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4407		WP0192.0	11/7/96	000031743	11/3/96
SC-08901-U	URANIUM-238	ND		3.38	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4407		WP0192.0	12/13/96	000031743	11/3/96
SC-08902-S	URANIUM-238	ND		3.43	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3689		WP0141.0	9/15/96	000025308	9/12/96
SC-08902-U	RADIUM-226	1.56	0.15	0.33	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4408		WP0192.0	12/13/96	000031744	11/3/96
SC-08902-U	RADIUM-228	1.45	0.15	0.60	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4408		WP0192.0	12/13/96	000031744	11/3/96
SC-08902-U	THORIUM-230	1.33	0.19	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4408		WP0192.0	11/7/96	000031744	11/3/96
SC-08902-U	URANIUM-238	19.10	2.49	3.80	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4408		WP0192.0	12/13/96	000031744	11/3/96
SC-08903-S	URANIUM-238	ND		4.34	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3690		WP0141.0	9/15/96	000025309	9/12/96
SC-08904-S	URANIUM-238	ND		2.90	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3691		WP0141.0	9/15/96	000025310	9/12/96
SC-08905-S	URANIUM-238	ND		4.29	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3692		WP0141.0	9/15/96	000025311	9/12/96
SC-08906-S	URANIUM-238	ND		3.51	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3693		WP0141.0	9/15/96	000025312	9/12/96
SC-08907-S	URANIUM-238	ND		4.38	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3694		WP0141.0	9/15/96	000025313	9/12/96
SC-08908-S	URANIUM-238	3.07	0.68	2.23	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3695		WP0141.0	9/15/96	000025314	9/12/96
SC-08909-S	URANIUM-238	ND		4.12	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3699		WP0142.0	9/13/96	000025315	9/12/96
SC-08910-S	URANIUM-238	ND		4.43	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3700		WP0142.0	9/13/96	000025316	9/12/96
SC-08911-S	URANIUM-238	3.02	0.99	2.81	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3701		WP0142.0	9/15/96	000025317	9/12/96
SC-08912-S	URANIUM-238	4.71	0.82	2.36	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3702		WP0142.0	9/13/96	000025318	9/12/96
SC-08913-S	URANIUM-238	3.37	0.73	2.22	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3696		WP0141.0	9/15/96	000025319	9/12/96
SC-08914-S	URANIUM-238	ND		4.37	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3697		WP0141.0	9/15/96	000025320	9/12/96
SC-08915-S	URANIUM-238	3.71	0.78	2.82	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3703		WP0142.0	9/15/96	000025321	9/12/96
SC-08916-S	URANIUM-238	ND		4.59	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3704		WP0142.0	9/15/96	000025322	9/12/96
SC-08917-S	URANIUM-238	3.95	0.74	2.27	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3705		WP0142.0	9/15/96	000025324	9/12/96
SC-08918-S	URANIUM-238	ND		4.29	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3706		WP0142.0	9/13/96	000025325	9/12/96
SC-08919-S	URANIUM-238	ND		4.16	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3707		WP0142.0	9/15/96	000025326	9/12/96
SC-08920-S	URANIUM-238	3.13	0.70	2.53	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3708		WP0142.0	9/15/96	000025327	9/12/96
SC-09001-S	URANIUM-238	5.56	0.94	2.69	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3709		WP0142.0	9/13/96	000025328	9/12/96

APPENDIX D TABLE D-1

WSSRAP ID	PARAMETER	CONC	ERR	DL	UNITS	VAL QUAL	COMMENTS	METHOD	MATRIX	CATEGORY	DIL FACT	LAB ID	LAB QUAL	LAB REQU	DATE ANA	SAMPLINK	DATE SAMPLED
SC-09002-S	URANIUM-238	7.28	1.68	4.23	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4076		WP0156.0	10/8/96	0000025329	10/4/96
SC-09003-S	URANIUM-238	2.55	0.75	2.91	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4077		WP0156.0	10/8/96	0000025330	10/4/96
SC-09004-S	URANIUM-238	ND		4.34	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4078		WP0156.0	10/8/96	0000025331	10/4/96
SC-09005-S	AROCLOR-1248	ND		41.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411005	U	QT2007.0	10/8/96	0000025332	10/4/96
SC-09005-S	AROCLOR-1254	ND		41.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411005	U	QT2007.0	10/8/96	0000025332	10/4/96
SC-09005-S	AROCLOR-1260	ND		41.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411005	U	QT2007.0	10/8/96	0000025332	10/4/96
SC-09005-S	ARSENIC	4.70		0.45	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411005		QT2007.0	10/8/96	0000025332	10/4/96
SC-09005-S	CHROMIUM	22.30		0.37	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411005		QT2007.0	10/8/96	0000025332	10/4/96
SC-09005-S	LEAD	27.30		0.20	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411005		QT2007.0	10/8/96	0000025332	10/4/96
SC-09005-S	RADIUM-226	1.68	0.10	0.27	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4079		WP0156.0	11/17/96	0000025332	10/4/96
SC-09005-S	RADIUM-228	1.45	0.14	0.39	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4079		WP0156.0	11/17/96	0000025332	10/4/96
SC-09005-S	THORIUM-230	0.91	0.10	0.72	PCI/G	A		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4079		WP0156.0	10/9/96	0000025332	10/4/96
SC-09005-S	URANIUM-238	ND		3.28	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4079		WP0156.0	11/17/96	0000025332	10/4/96
SC-09006-S	URANIUM-238	ND		4.56	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3710		WP0142.0	9/15/96	0000025333	9/12/96
SC-09007-S	URANIUM-238	3.61	0.79	2.54	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4080		WP0156.0	10/8/96	0000025334	10/4/96
SC-09008-S	URANIUM-238	3.88	0.74	2.23	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4081		WP0156.0	10/8/96	0000025335	10/4/96
SC-09009-S	URANIUM-238	ND		4.17	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4082		WP0156.0	10/8/96	0000025336	10/4/96
SC-09010-S	AROCLOR-1248	ND		40.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411006	U	QT2007.0	10/9/96	0000025337	10/4/96
SC-09010-S	AROCLOR-1254	ND		40.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411006	U	QT2007.0	10/9/96	0000025337	10/4/96
SC-09010-S	AROCLOR-1260	ND		40.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411006	U	QT2007.0	10/9/96	0000025337	10/4/96
SC-09010-S	ARSENIC	9.50		0.43	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411006		QT2007.0	10/8/96	0000025337	10/4/96
SC-09010-S	CHROMIUM	17.20		0.36	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411006		QT2007.0	10/8/96	0000025337	10/4/96
SC-09010-S	LEAD	19.00		0.19	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411006		QT2007.0	10/8/96	0000025337	10/4/96
SC-09010-S	RADIUM-226	1.26	0.13	0.47	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4083		WP0156.0	11/17/96	0000025337	10/4/96
SC-09010-S	RADIUM-228	1.88	0.19	0.42	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4083		WP0156.0	11/17/96	0000025337	10/4/96
SC-09010-S	THORIUM-230	1.34	0.17	0.72	PCI/G	A		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4083		WP0156.0	10/8/96	0000025337	10/4/96
SC-09010-S	URANIUM-238	4.69	1.21	3.91	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4083		WP0156.0	11/17/96	0000025337	10/4/96
SC-09011-S	URANIUM-238	4.31	1.21	3.28	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3711		WP0142.0	9/13/96	0000025338	9/12/96
SC-09012-S	URANIUM-238	4.55	0.81	2.27	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4084		WP0156.0	10/8/96	0000025339	10/4/96
SC-09013-S	URANIUM-238	5.45	1.03	3.50	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4085		WP0156.0	10/8/96	0000025340	10/4/96
SC-09014-S	URANIUM-238	ND		4.31	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4086		WP0156.0	10/8/96	0000025341	10/4/96
SC-09015-S	AROCLOR-1248	ND		41.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411007	U	QT2007.0	10/9/96	0000025342	10/4/96
SC-09015-S	AROCLOR-1254	ND		41.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411007	U	QT2007.0	10/9/96	0000025342	10/4/96
SC-09015-S	AROCLOR-1260	ND		41.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411007	U	QT2007.0	10/9/96	0000025342	10/4/96
SC-09015-S	ARSENIC	12.20		0.45	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411007		QT2007.0	10/8/96	0000025342	10/4/96
SC-09015-S	CHROMIUM	16.70		0.37	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411007		QT2007.0	10/8/96	0000025342	10/4/96
SC-09015-S	LEAD	18.50		0.20	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411007		QT2007.0	10/8/96	0000025342	10/4/96
SC-09015-S	RADIUM-226	1.48	0.10	0.31	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4088		WP0156.0	11/17/96	0000025342	10/4/96
SC-09015-S	RADIUM-228	1.39	0.15	0.48	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4088		WP0156.0	11/17/96	0000025342	10/4/96
SC-09015-S	THORIUM-230	1.08	0.12	0.72	PCI/G	A		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4088		WP0156.0	10/8/96	0000025342	10/4/96
SC-09015-S	URANIUM-238	ND		3.28	PCI/G	U	"T"	HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4088		WP0156.0	11/17/96	0000025342	10/4/96
SC-09016-S	URANIUM-238	ND		4.42	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3712		WP0142.0	9/13/96	0000025343	9/12/96
SC-09017-S	URANIUM-238	3.07	0.68	1.87	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3713		WP0142.0	9/13/96	0000025344	9/12/96
SC-09018-S	URANIUM-238	4.28	0.81	2.35	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3714		WP0142.0	9/15/96	0000025345	9/12/96
SC-09019-S	URANIUM-238	ND		4.43	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4089		WP0156.0	10/8/96	0000025346	10/4/96
SC-09020-S	AROCLOR-1248	ND		40.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411008	U	QT2007.0	10/9/96	0000025347	10/4/96
SC-09020-S	AROCLOR-1254	ND		40.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411008	U	QT2007.0	10/9/96	0000025347	10/4/96
SC-09020-S	AROCLOR-1260	ND		40.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411008	U	QT2007.0	10/9/96	0000025347	10/4/96
SC-09020-S	ARSENIC	9.90		0.43	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411008		QT2007.0	10/8/96	0000025347	10/4/96
SC-09020-S	CHROMIUM	17.20		0.36	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411008		QT2007.0	10/8/96	0000025347	10/4/96
SC-09020-S	LEAD	20.50		0.19	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411008		QT2007.0	10/8/96	0000025347	10/4/96

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WSSRAP ID	PARAMETER	CONC	ERR	DL	UNITS	VAL QUAL	COMMENTS	METHOD	MATRIX	CATEGORY	DIL FACT	LAB ID	LAB QUAL	LAB REQU	DATE ANA	SAMPLINK	DATE SAMPLED
SC-09020-S	RADIUM-226	1.49	0.10	0.25	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4090		WP0156.0	11/17/96	0000025347	10/4/96
SC-09020-S	RADIUM-228	1.11	0.13	0.49	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4090		WP0156.0	11/17/96	0000025347	10/4/96
SC-09020-S	THORIUM-230	1.01	0.11	0.72	PCI/G	A		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4090		WP0156.0	10/8/96	0000025347	10/4/96
SC-09020-S	URANIUM-238	ND		3.28	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4090		WP0156.0	11/17/96	0000025347	10/4/96
SC-09101-S	URANIUM-238	6.03	0.95	2.06	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4184		WP0162.0	10/11/96	0000025348	10/9/96
SC-09102-S	URANIUM-238	ND		3.17	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4185		WP0162.0	10/12/96	0000025349	10/9/96
SC-09103-S	URANIUM-238	ND		3.79	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4186		WP0162.0	10/12/96	0000025350	10/9/96
SC-09104-S	URANIUM-238	ND		4.45	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4187		WP0162.0	10/12/96	0000025351	10/9/96
SC-09105-C	URANIUM-238	5.71	0.93	2.06	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4188		WP0162.0	10/12/96	0000025353	10/9/96
SC-09105-S	URANIUM-238	ND		4.80	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4189		WP0162.0	10/11/96	0000025352	10/9/96
SC-09106-S	URANIUM-238	ND		3.22	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4190		WP0162.0	10/11/96	0000025355	10/9/96
SC-09107-S	URANIUM-238	8.11	1.61	3.49	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4191		WP0162.0	10/12/96	0000025356	10/9/96
SC-09108-S	URANIUM-238	ND		3.28	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4192		WP0162.0	10/12/96	0000025357	10/9/96
SC-09109-S	URANIUM-238	ND		4.17	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4193		WP0162.0	10/12/96	0000025358	10/9/96
SC-09110-S	URANIUM-238	13.20	1.66	2.44	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4194		WP0162.0	10/12/96	0000025359	10/9/96
SC-09111-S	URANIUM-238	3.14	0.82	3.11	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4195		WP0162.0	10/11/96	0000025361	10/9/96
SC-09112-S	URANIUM-238	ND		3.77	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4196		WP0162.0	10/12/96	0000025362	10/9/96
SC-09113-S	URANIUM-238	10.60	1.41	3.59	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4091		WP0156.0	10/8/96	0000025363	10/4/96
SC-09114-C	URANIUM-238	2.70	0.67	2.31	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4197		WP0162.0	10/12/96	0000025365	10/9/96
SC-09114-S	URANIUM-238	8.30	1.58	3.24	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4198		WP0162.0	10/12/96	0000025364	10/9/96
SC-09115-S	URANIUM-238	15.10	2.02	4.46	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4199		WP0162.0	10/12/96	0000025366	10/9/96
SC-09116-S	URANIUM-238	ND		4.18	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4200		WP0162.0	10/12/96	0000025367	10/9/96
SC-09117-S	URANIUM-238	16.20	2.01	3.43	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4093		WP0156.0	10/8/96	0000025369	10/4/96
SC-09118-S	URANIUM-238	14.00	1.87	2.38	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4201		WP0162.0	10/12/96	0000025370	10/9/96
SC-09119-S	URANIUM-238	12.00	1.98	5.00	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4202		WP0162.0	10/12/96	0000025371	10/9/96
SC-09120-S	URANIUM-238	8.85	1.83	4.07	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4203		WP0162.0	10/11/96	0000025372	10/9/96
SC-09121-C	URANIUM-238	21.40	2.61	4.58	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4204		WP0162.0	10/11/96	0000025374	10/9/96
SC-09121-S	URANIUM-238	12.00	1.66	4.17	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4094		WP0156.0	10/7/96	0000025373	10/4/96
SC-09122-S	URANIUM-238	21.60	2.28	2.72	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4205		WP0162.0	10/11/96	0000025375	10/9/96
SC-09123-S	URANIUM-238	17.60	1.97	3.32	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4206		WP0162.0	10/12/96	0000025376	10/9/96
SC-09124-S	URANIUM-238	8.57	1.35	3.05	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4207		WP0162.0	10/11/96	0000025378	10/9/96
SC-09125-S	URANIUM-238	10.40	1.44	2.18	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4095		WP0156.0	10/8/96	0000025379	10/4/96
SC-09126-S	URANIUM-238	13.50	2.04	4.18	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4096		WP0156.0	10/8/96	0000025380	10/4/96
SC-09127-S	URANIUM-238	23.10	2.48	3.33	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4097		WP0156.0	10/8/96	0000025381	10/4/96
SC-09128-S	URANIUM-238	9.88	1.53	3.35	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4098		WP0156.0	10/8/96	0000025382	10/4/96
SC-09201-S	URANIUM-238	ND		3.77	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3715		WP0142.0	9/13/96	0000025383	9/12/96
SC-09202-S	URANIUM-238	ND		3.04	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4324		WP0172.0	10/21/96	0000025384	10/10/96
SC-09203-S	URANIUM-238	ND		4.07	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4210		WP0164.0	10/11/96	0000025386	10/10/96
SC-09204-S	AROCLOR-1248	ND		42.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12457001	U	QT2013.0	10/14/96	0000025387	10/10/96
SC-09204-S	AROCLOR-1254	ND		42.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12457001	U	QT2013.0	10/14/96	0000025387	10/10/96
SC-09204-S	AROCLOR-1260	ND		42.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12457001	U	QT2013.0	10/14/96	0000025387	10/10/96
SC-09204-S	ARSENIC	7.10		0.45	UG/G	*		EPA CLP	SOIL	METALS	1.00	12457001		QT2013.0	10/11/96	0000025387	10/10/96
SC-09204-S	CHROMIUM	18.90		0.38	UG/G	*		EPA CLP	SOIL	METALS	1.00	12457001		QT2013.0	10/11/96	0000025387	10/10/96
SC-09204-S	LEAD	13.90		0.20	UG/G	*		EPA CLP	SOIL	METALS	1.00	12457001		QT2013.0	10/11/96	0000025387	10/10/96
SC-09204-S	RADIUM-226	1.47	0.12	0.40	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4219		WP0165.0	11/19/96	0000025387	10/10/96
SC-09204-S	RADIUM-228	1.51	0.19	0.54	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4219		WP0165.0	11/19/96	0000025387	10/10/96
SC-09204-S	THORIUM-230	0.93	0.09	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4219		WP0165.0	10/18/96	0000025387	10/10/96
SC-09204-S	URANIUM-238	ND		3.98	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4219		WP0165.0	11/19/96	0000025387	10/10/96
SC-09205-S	URANIUM-238	ND		3.85	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4212		WP0164.0	10/13/96	0000025390	10/10/96
SC-09206-S	URANIUM-238	ND		3.71	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3716		WP0142.0	9/13/96	0000025391	9/12/96
SC-09207-S	URANIUM-238	ND		4.10	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4213		WP0164.0	10/11/96	0000025392	10/10/96

APPENDIX D TABLE D-1

WSSRAP ID	PARAMETER	CONC	ERR	DL	UNITS	VAL QUAL	COMMENTS	METHOD	MATRIX	CATEGORY	DIL FACT	LAB ID	LAB QUAL	LAB REQU	DATE ANA	SAMPLINK	DATE SAMPLED
SC-09208-S	URANIUM-238	ND		2.94	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4214		WP0164.0	10/11/96	0000025393	10/10/96
SC-09209-S	AROCLOR-1248	ND		41.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12457002	U	QT2013.0	10/14/96	0000025394	10/10/96
SC-09209-S	AROCLOR-1254	ND		41.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12457002	U	QT2013.0	10/14/96	0000025394	10/10/96
SC-09209-S	AROCLOR-1260	ND		41.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12457002	U	QT2013.0	10/14/96	0000025394	10/10/96
SC-09209-S	ARSENIC	10.20		0.44	UG/G	*		EPA CLP	SOIL	METALS	1.00	12457002		QT2013.0	10/11/96	0000025394	10/10/96
SC-09209-S	CHROMIUM	19.50		0.37	UG/G	*		EPA CLP	SOIL	METALS	1.00	12457002		QT2013.0	10/11/96	0000025394	10/10/96
SC-09209-S	LEAD	16.50		0.20	UG/G	*		EPA CLP	SOIL	METALS	1.00	12457002		QT2013.0	10/11/96	0000025394	10/10/96
SC-09209-S	RADIUM-226	1.84	0.10	0.25	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4220		WP0165.0	11/19/96	0000025394	10/10/96
SC-09209-S	RADIUM-228	1.26	0.14	0.49	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4220		WP0165.0	11/19/96	0000025394	10/10/96
SC-09209-S	THORIUM-230	1.06	0.12	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4220		WP0165.0	10/18/96	0000025394	10/10/96
SC-09209-S	URANIUM-238	ND		3.12	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4220		WP0165.0	11/19/96	0000025394	10/10/96
SC-09210-S	URANIUM-238	5.81	0.96	2.06	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4215		WP0164.0	10/11/96	0000025395	10/10/96
SC-09211-S	URANIUM-238	ND		4.12	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3717		WP0142.0	9/13/96	0000025396	9/12/96
SC-09212-S	URANIUM-238	ND		3.04	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4216		WP0164.0	10/13/96	0000025397	10/10/96
SC-09213-S	URANIUM-238	ND		4.03	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4217		WP0164.0	10/13/96	0000025398	10/10/96
SC-09214-S	AROCLOR-1248	ND		43.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12457003	U	QT2013.0	10/14/96	0000025399	10/10/96
SC-09214-S	AROCLOR-1254	ND		43.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12457003	U	QT2013.0	10/14/96	0000025399	10/10/96
SC-09214-S	AROCLOR-1260	ND		43.00	UG/KG	*		EPA 8080A	SOIL	PEST/PCBS	1.00	12457003	U	QT2013.0	10/14/96	0000025399	10/10/96
SC-09214-S	ARSENIC	8.20		0.46	UG/G	*		EPA CLP	SOIL	METALS	1.00	12457003		QT2013.0	10/11/96	0000025399	10/10/96
SC-09214-S	CHROMIUM	17.30		0.38	UG/G	*		EPA CLP	SOIL	METALS	1.00	12457003		QT2013.0	10/11/96	0000025399	10/10/96
SC-09214-S	LEAD	14.10		0.21	UG/G	*		EPA CLP	SOIL	METALS	1.00	12457003		QT2013.0	10/11/96	0000025399	10/10/96
SC-09214-S	RADIUM-226	1.37	0.13	0.46	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4221		WP0165.0	11/19/96	0000025399	10/10/96
SC-09214-S	RADIUM-228	1.07	0.18	0.65	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4221		WP0165.0	11/19/96	0000025399	10/10/96
SC-09214-S	THORIUM-230	0.97	0.10	0.72	PCI/G	*		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4221		WP0165.0	10/18/96	0000025399	10/10/96
SC-09214-S	URANIUM-238	ND		4.07	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4221		WP0165.0	11/19/96	0000025399	10/10/96
SC-09215-S	URANIUM-238	13.50	1.63	3.12	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4218		WP0164.0	10/13/96	0000025400	10/10/96
SC-09216-S	URANIUM-238	4.41	0.80	2.30	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3718		WP0142.0	9/13/96	0000025401	9/12/96
SC-09217-S	URANIUM-238	ND		3.14	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4099		WP0156.0	10/8/96	0000025402	10/4/96
SC-09218-S	URANIUM-238	ND		3.91	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4100		WP0156.0	10/8/96	0000025403	10/4/96
SC-09219-S	AROCLOR-1248	ND		39.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411009	U	QT2007.0	10/9/96	0000025404	10/4/96
SC-09219-S	AROCLOR-1254	ND		39.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411009	U	QT2007.0	10/9/96	0000025404	10/4/96
SC-09219-S	AROCLOR-1260	ND		39.00	UG/KG	U		EPA 8080A	SOIL	PEST/PCBS	1.00	12411009	U	QT2007.0	10/9/96	0000025404	10/4/96
SC-09219-S	ARSENIC	15.90		0.42	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411009		QT2007.0	10/8/96	0000025404	10/4/96
SC-09219-S	CHROMIUM	16.30		0.35	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411009		QT2007.0	10/8/96	0000025404	10/4/96
SC-09219-S	LEAD	23.80		0.19	UG/G	A		EPA CLP	SOIL	METALS	1.00	12411009		QT2007.0	10/8/96	0000025404	10/4/96
SC-09219-S	RADIUM-226	1.32	0.12	0.34	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4101		WP0156.0	11/21/96	0000025404	10/4/96
SC-09219-S	RADIUM-228	1.41	0.20	0.82	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4101		WP0156.0	11/21/96	0000025404	10/4/96
SC-09219-S	THORIUM-230	0.98	0.10	0.72	PCI/G	A		EML TH-01	SOIL	RADIOCHEMICAL	1.00	WSC4101		WP0156.0	10/8/96	0000025404	10/4/96
SC-09219-S	URANIUM-238	ND		4.12	PCI/G	U		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4101		WP0156.0	11/21/96	0000025404	10/4/96
SC-09220-S	URANIUM-238	8.56	1.26	3.25	PCI/G	A		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC4102		WP0156.0	10/7/96	0000025405	10/4/96
SC-09301-S	URANIUM-238	ND		3.21	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3719		WP0142.0	9/13/96	0000025406	9/12/96
SC-09302-S	URANIUM-238	ND		4.10	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3720		WP0142.0	9/13/96	0000025407	9/12/96
SC-09303-S	URANIUM-238	ND		3.60	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3721		WP0142.0	9/13/96	0000025408	9/12/96
SC-09304-S	URANIUM-238	ND		3.21	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3723		WP0142.0	9/13/96	0000025409	9/12/96
SC-09305-S	URANIUM-238	ND		4.19	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3724		WP0142.0	9/13/96	0000025410	9/12/96
SC-09306-S	URANIUM-238	ND		3.95	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3725		WP0142.0	9/13/96	0000025411	9/12/96
SC-09307-S	URANIUM-238	ND		4.29	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3726		WP0142.0	9/13/96	0000025412	9/12/96
SC-09308-S	URANIUM-238	2.24	0.64	2.24	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3727		WP0142.0	9/13/96	0000025413	9/12/96
SC-09309-S	URANIUM-238	ND		3.20	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3728		WP0142.0	9/15/96	0000025414	9/12/96
SC-09310-S	URANIUM-238	ND		4.00	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3729		WP0142.0	9/13/96	0000025415	9/12/96
SC-09311-S	URANIUM-238	ND		3.04	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3730		WP0142.0	9/13/96	0000025416	9/12/96

APPENDIX D TABLE D-1

WSSRAP ID	PARAMETER	CONC	ERR	DL	UNITS	VAL QUAL	COMMENTS	METHOD	MATRIX	CATEGORY	DIL FACT	LAB ID	LAB QUAL	LAB REQU	DATE ANA	SAMPLINK	DATE SAMPLED
SC-09312-S	URANIUM-238	ND		3.19	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3731		WP0142.0	9/13/96	0000025417	9/12/96
SC-09313-S	URANIUM-238	6.21	1.43	3.52	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3732		WP0142.0	9/15/96	0000025418	9/12/96
SC-09314-S	URANIUM-238	3.13	0.78	2.68	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3733		WP0142.0	9/13/96	0000025419	9/12/96
SC-09315-S	URANIUM-238	ND		4.48	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3734		WP0142.0	9/13/96	0000025420	9/12/96
SC-09316-S	URANIUM-238	2.77	0.68	2.29	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3735		WP0142.0	9/13/96	0000025421	9/12/96
SC-09317-S	URANIUM-238	ND		3.20	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3736		WP0142.0	9/13/96	0000025422	9/12/96
SC-09318-S	URANIUM-238	ND		3.98	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3737		WP0142.0	9/15/96	0000025423	9/12/96
SC-09319-S	URANIUM-238	ND		3.42	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3738		WP0142.0	9/13/96	0000025424	9/12/96
SC-09320-S	URANIUM-238	5.17	1.10	3.10	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3739		WP0142.0	9/13/96	0000025425	9/12/96
SC-09321-S	URANIUM-238	ND		4.97	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3740		WP0142.0	9/13/96	0000025426	9/12/96
SC-09322-S	URANIUM-238	ND		3.34	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3741		WP0142.0	9/13/96	0000025427	9/12/96
SC-09323-S	URANIUM-238	ND		4.53	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3742		WP0142.0	9/13/96	0000025428	9/12/96
SC-09324-S	URANIUM-238	3.13	0.69	2.30	PCI/G	*		HASL300	SOIL	RADIOCHEMICAL	1.00	WSC3744		WP0142.0	9/13/96	0000025429	9/12/96

APPENDIX D TABLE D-1

WSSRAP ID	PARAMETER	CONC	ERR	DL	UNITS	VAL QUAL	COMMENTS	METHOD	MATRIX	CATEGORY	DIL FACT	LAB ID	LAB QUAL	LAB REQU	DATE ANA	SAMPLINK	DATE SAMPLED

LEGEND:

WSSRAP ID	WSSRAP IDENTIFICATION CODE
PARAMETER	PARAMETER THAT WAS ANALYZED
CONC	CONCENTRATION (ND = NON-DETECTED)
ERR	ANALYTICAL ERROR
DL	DETECTION LIMIT
UNITS	APPROPRIATE UNITS
COMMENTS	ASSOCIATED COMMENTS WITH SAMPLE
VAL QUAL	VALIDATION QUALIFIER:
	A = DATA MEETING ALL QA/QC REQUIREMENTS. THE PARAMETER WAS ANALYZED FOR AND DETECTED.
	U = DATA MEETING ALL QA/QC REQUIREMENTS. THE PARAMETER WAS ANALYZED FOR BUT NOT DETECTED. IF A NUMBER IS INCLUDED WITH THE QUALIFIER, THE DL HAS BEEN RAISED TO THE LEVEL IN THE SAMPLE DUE TO BLANK CONTAMINATION
	J = DATA THAT ARE AN ESTIMATE OR ARE ADEQUATE FOR A SEMI-QUANTITATIVE ASSESSMENT.
	UJ = THE PARAMETER WAS ANALYZED FOR, BUT WAS NOT DETECTED. THE ASSOCIATED VALUE IS AN ESTIMATED QUANTITY.
	N = PRESUMPTIVE EVIDENCE OF PRESENCE OF PARAMETER WITH NO ESTIMATION OF QUANTITY.
	NJ = PRESUMPTIVE EVIDENCE OF PRESENCE OF PARAMETER AT AN ESTIMATED QUANTITY.
	DL = DETECTION LIMIT REQUIREMENTS HAVE NOT BEEN MET. DATA QUALITY OBJECTIVES MAY NOT BE MET.
	UI = UNCERTAIN IDENTIFICATION OF THE PARAMETER.
	JE = THE RADIOLOGICAL UNCERTAINTY IS AN ESTIMATED QUANTITY.
	R = DATA THE ATE UNUSABLE (PARAMETER MAY OR MAY NOT BE PRESENT).
	" = DATA THAT HAVE BEEN VALIDATED.
	V = DATA THAT APPEAR TO BE VALID BASED ON SIMILAR DATA FROM IDENTICAL SAMPLING LOCATIONS OR BY COMPARISON TO HISTORICAL RECORDS.
	O = DATA THAT ARE ON HOLD
	X = DATA THAT CANNOT BE VALIDATED DUE TO MISSING LABORATORY INFORMATION.
METHOD	ANALYTICAL METHOD
MATRIX	SAMPLE MATRIX
CATEGORY	ANALYTICAL CATEGORY
DIL	DILUTION FACTOR
LAB ID	IDENTIFICATION GIVEN BY THE LAB
LAB QUAL	LABORATORY QUALIFIER
LAB REQU	LABORATORY REQUEST NUMBER
DATE ANA	DATE ANALYZED
SAMPLINK	SAMPLE LINK NUMBER
DATE SAM	DATE SAMPLED

WSSRAP_ID	DATE_SAM	PARAMETER	CONC	DL	UNITS	VER_QU	VAL_QUAL	REV_QU	METHOD	MATRIX	CATEGORY
SC-09313-S	09/12/96	URANIUM-238	6.21	3.52	PCI/G		*		HASL300	SOIL	RADIOCHEMICAL
SC-09314-S	09/12/96	URANIUM-238	3.13	2.68	PCI/G		*		HASL300	SOIL	RADIOCHEMICAL
SC-09315-S	09/12/96	URANIUM-238	ND	4.48	PCI/G		*		HASL300	SOIL	RADIOCHEMICAL
SC-09316-S	09/12/96	URANIUM-238	2.77	2.29	PCI/G		*		HASL300	SOIL	RADIOCHEMICAL
SC-09317-S	09/12/96	URANIUM-238	ND	3.20	PCI/G		*		HASL300	SOIL	RADIOCHEMICAL
SC-09318-S	09/12/96	URANIUM-238	ND	3.98	PCI/G		*		HASL300	SOIL	RADIOCHEMICAL
SC-09319-S	09/12/96	URANIUM-238	ND	3.42	PCI/G		*		HASL300	SOIL	RADIOCHEMICAL
SC-09320-S	09/12/96	URANIUM-238	5.17	3.10	PCI/G		*		HASL300	SOIL	RADIOCHEMICAL
SC-09321-S	09/12/96	URANIUM-238	ND	4.97	PCI/G		*		HASL300	SOIL	RADIOCHEMICAL
SC-09322-S	09/12/96	URANIUM-238	ND	3.34	PCI/G		*		HASL300	SOIL	RADIOCHEMICAL
SC-09323-S	09/12/96	URANIUM-238	ND	4.53	PCI/G		*		HASL300	SOIL	RADIOCHEMICAL
SC-09324-S	09/12/96	URANIUM-238	3.13	2.30	PCI/G		*		HASL300	SOIL	RADIOCHEMICAL

APPENDIX E

Unpublished Documents

MORRISON KNUDSEN CORPORATION

MK-FERGUSON GROUP

INTER-OFFICE CORRESPONDENCE

DATE: November 17, 1995

TO: ALARA Committee

FROM: Michelle French/Richard Machado

SUBJECT: **RA-226 DETERMINATION FOR SITE CONFIRMATION SAMPLES**

Background

The issue surrounding Ra-226 analysis via gamma spectroscopy arises due to the fact that the Ra-226 soil concentration is determined by using the following energy peaks: 295 keV and 352 keV for Pb-214; and 609 keV, 1120 keV, and 1764 keV for Bi-214. These radionuclides are both short-lived daughters of Rn-222. The drying and grinding processes are known to drive off Rn-222 that is trapped in the soil pores and moisture held in the soil. In order to quantitatively identify Ra-226 using gamma spectroscopy, Rn-222 and its short-lived progeny must be allowed to grow into secular equilibrium following such sample preparation techniques. The following alternatives were evaluated for estimating the Ra-226 concentration in soil given gamma spectroscopy analysis within five working days of sample collection.

Alternative 1

Send all samples requiring Ra-226 analysis to an offsite laboratory. At offsite facilities, Ra-226 is typically analyzed through alpha spectroscopy which does not rely on the Ra-222 daughter products to provide a quantitative result. The minimum turnaround time that can be provided for alpha spectroscopy analysis for Ra-226 is four days. At one and two day turnaround times, the method for analysis is modified to use Gas Flow Proportional Counting for total alpha counting yielding a total radium number with no separation of isotopic contributions. Given the four day turnaround time and an estimate of 750 samples (WP-253 and WP-420), the total analytical costs will be $95,250.

The major disadvantage in this approach is the tight schedule involved with sample collection, packaging, shipping, data receipt, data review, and ALARA committee action. It may be impossible to accomplish this within five working days given the four day turnaround requirement.

Alternative 2

As stated above, the drying and grinding processes are known to drive off radon that is trapped in the soil matrix. However, the amount of radon removed from these processes is not quantified. If you were to assume that all the radon is removed during these processes and the time of final preparation was recorded, a correction factor can be applied based upon the secular equilibrium condition equation. For example, the following table summarizes the ratio of activity of Rn-222 to the activity of Ra-226.

A(Rn-222)/A(Ra-226)	Time Post Canning (Days)
0.167	1
0.306	2
0.422	3
0.665	6
0.807	9
0.888	12
0.935	15
0.963	18
0.978	21
0.987	24
0.993	27
0.996	30

Thus, if the samples were counted three days post canning, a correction factor of 0.422 would be used to determine the estimated final Ra-226 concentration. Given this approach, any concentration determined three days post preparation would be divided by 0.422 to arrive at the final concentration. For a 5 pCi/g ALARA goal, any result above 2.1 pCi/g would be rejected.

The major limitation with this approach is the assumption that the drying and grinding processes remove 100% of the radon. Samples that have been analyzed within one day of preparation have never yielded results much below expected background concentrations (0.8-1.0 pCi/g).

Thus, the use of a correction factor on the order of 0.167 could result in a very conservative approach for estimating the final Ra-226 soil concentration in background soils (in fact all samples analyzed one day after canning would equal or exceed 5 pCi/g).

Alternative 3

All samples that are collected to support confirmation can be analyzed as wet samples to virtually eliminate the radon removal that occurs during sample preparation. However, there are numerous considerations, such as sample homogeneity, particle size, moisture content variability, etc., that can produce error in such analyses. If the samples are analyzed wet, they would also be prepared and analyzed to provide final concentrations for each radionuclide of interest for the sample. This dry evaluation would require an analysis within the confirmation cleanup turnaround period and a second analysis within 20-30 days later to finalize Ra-226 concentrations to an acceptable quality level. This approach would involve three analyses of every sample. The initial wet analysis can be used to estimate the final Ra-226 concentration. However, this estimate must be made on a case by case basis through moisture corrections, etc.

The major limitation for this approach is the reduction in lab productivity as an extra canning effort would be needed to generate a wet and a dry sample for each sample and count time for each sample would increase by a factor of three.

Alternative 4

Over the last several months, the onsite radiological laboratory has been recounting samples that were analyzed during the months of April - September 1995. These reanalyses were done in order to support final analyses of SE Drainage and Quarry characterization samples. The graph on the attached page illustrates a portion of the recount results versus the initial results. The graph includes those samples that had initial Ra-226 results < 5 pCi/g. As illustrated, the background - 2.2 pCi/g sample range had 100% of all sample recounts fall less than 5 pCi/g. For those in the range of 2.2 - 3.2 pCi/g, the likelihood of exceeding 5 pCi/g was approximately 50%. All of the samples with initial results greater than 3.2 pCi/g had final Ra-226 results > 5 pCi/g.

This information can be used to establish a criteria about which samples can be said to meet the ALARA goal of 5 pCi/g within the five working day turnaround window.

Given the current study findings, it is recommended that any sample with an initial Ra-226 result > 2.2 pCi/g be expected to exceed the ALARA goal of 5 pCi/g. In addition, the estimated final Ra-226 soil concentration should be found by multiplying the initial result by 2.27 (2.2 pCi/g x 2.27 = 5 pCi/g). This correction factor is very close to the maximum increase from initial results to recount results (e.g., 2.56) in the background to 2.2 pCi/g concentration range. The average increase from initial results to recount results for this range was 1.51. However, use of a value closer to the maximum value affords less risk in exceeding expected confirmation goals. The laboratory will work to refine these numbers to further minimize the risk as they continue to recount samples collected over the last few months. The major limitation with this alternative is the potential to over excavate, increasing disposal costs.

Alternative 5

This alternative involves a combination of alternatives 3 and 4. Samples that do not have elevated direct survey results via a 2x2 NaI or a 44-9 survey should be prepared and evaluated in accordance with alternative 4. Samples that do have above background survey results will be analyzed wet and evaluated accordingly to determine the estimated final Ra-226 concentration. The sample will then be prepared and analyzed a second time to provide quality level data for the other radionuclides of interest. In addition, each prepared sample would be analyzed within 30 days after preparation to finalize the Ra-226 concentration to an acceptable quality level.

The major limitation with this approach is the loss in productivity as a result of the double canning needs and increased count times for a portion of the samples.

Recommendation

The Onsite Radiological Laboratory recommends the use of alternative 4. This alternative minimizes risk of failing to meet expected cleanup ALARA goals and provides for maximum efficiency/productivity within the laboratory. The second favorable alternative is number 5. This alternative would increase the workload in the laboratory, but would further reduce the risk of over excavation and failure to meet desired cleanup objectives.

 RA-226 DETERMINATION FOR SITE CONFIRMATION SAMPLES

In all of the above alternatives, the estimated final Ra-226 concentration will be used in conjunction with the measured Ra-228 concentration as follows to determine if the mixture rule for the ALARA goals as described in the Record of Decision is achieved.

$$\frac{\text{Est. Final Ra-226 (pCi/g)}}{5\ \text{pCi/g}} + \frac{\text{Ra-228 (pCi/g)}}{5\ \text{pCi/g}} = \text{Mixture Ratio}$$

If mixture ratio <= 1, then the sample meets cleanup confirmation design. If mixture ratio > 1, then the sample must be considered by the ALARA committee.

MLF/RM/pr

Attachment

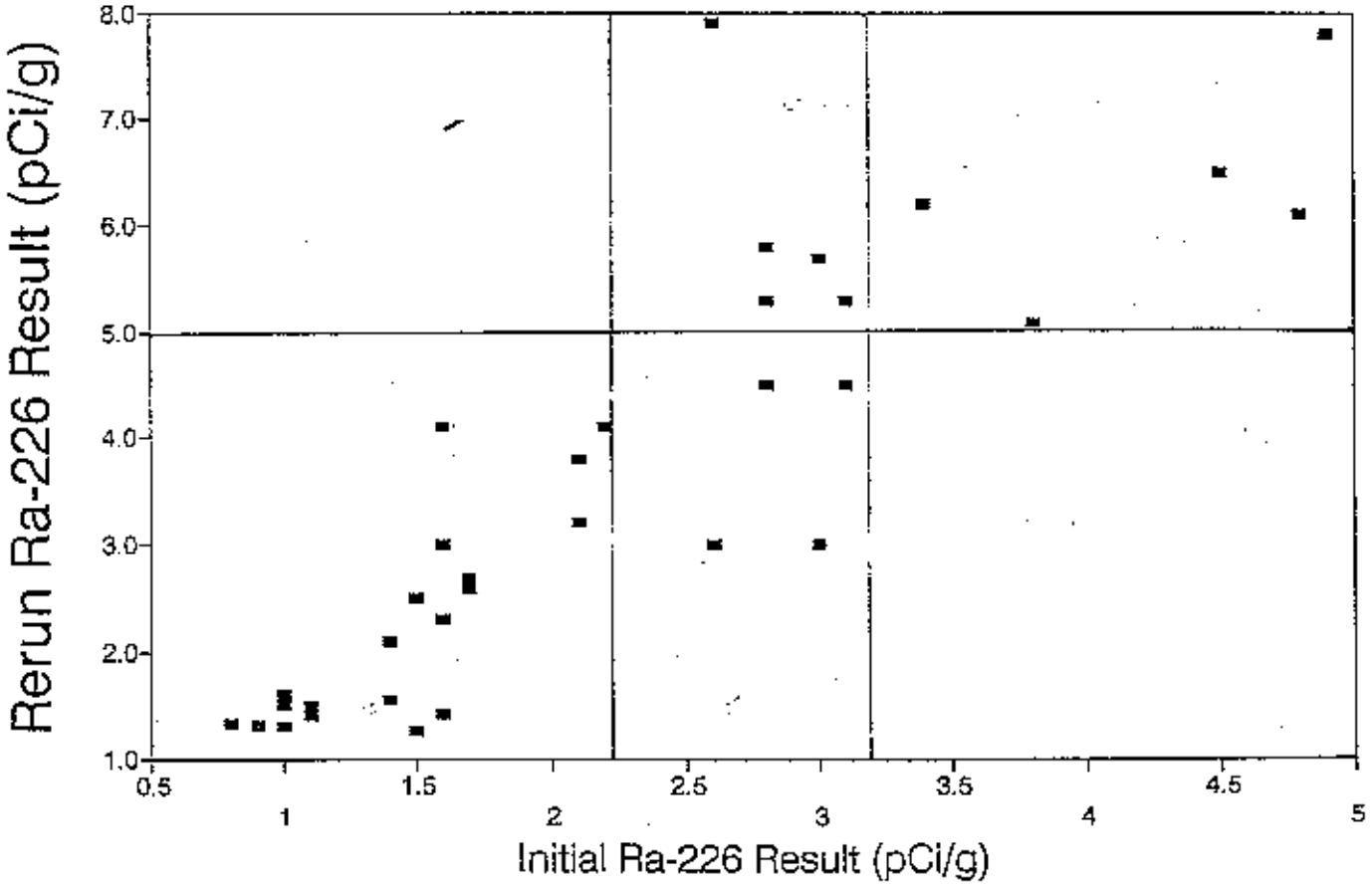
Distribution:

Ken Meyer	Alternates:	Marj Wesley
Steve Warren		Jack Cooney
Ken Greenwell		Dan Hoffman
Jim Meier		

cc: Melissa Lutz

Ra226 Concentration Range

Background - 5.0 pCi/g



MORRISON KNUDSEN CORPORATION

MK-FERGUSON GROUP

INTER-OFFICE CORRESPONDENCE

DATE: November 20, 1995

TO: ALARA Committee

FROM: Richard Machado/Michelle French MF

SUBJECT: **TH232 DETERMINATION FOR SITE CONFIRMATION SAMPLES**

Th232 can occur in two forms at the site: (1) naturally and (2) processed to purify Th232. Both of these forms are subject to the same transformation equation. Given a Th232 half life of 1.39 x 10^{10} years and a Ra228 half life of 5.75 years, a condition known as secular equilibrium occurs. Secular equilibrium occurs when the half life of the parent is very much greater than that of the daughter. If an initially pure parent (Th232) is formed, its radioactive transformation will result in accumulation of the daughter (Ra228). Since the daughter (Ra228) decays very much faster than the parent (Th232), a point is soon reached at which the amount of parent (Th232) present is equal to that of the daughter (Ra228).

The equation that represents this condition of secular equilibrium is:

$$Q_B = Q_A (1 - e^{-\lambda_B t})$$

where Q_A=parent (Th232) activity, Q_B=daughter (Ra228) activity, t=time since placement of material, and λ_B=decay constant for daughter (Ra228). Therefore, the fraction of daughter activity to parent activity

$$\left(\frac{A(RA\text{-}228)}{A(Th\text{-}232)}\right)$$

present at the WSSRAP in 1995 can be calculated.

Assume that production ceased at the site on January 1, 1965, and that all Th232 was produced on that very last day (t=30.9 years). Given a half life for Ra228 of 5.75 years, the decay constant would equal

$$(\lambda_B = 0.121\ Y^{-1})$$

11-35-95

Given this information, the ratio of Ra228 activity to Th232 activity can be calculated as follows:

$$\frac{Q_B}{Q_A} = \frac{A\,(Ra\text{-}228)}{A\,(Th\text{-}232)} = 1 - e^{-\lambda_B t}$$

$$\frac{A\,(Ra228)}{A\,(Th232)} = 1 - e^{-(0.121Y^{-1})\,(30.9\,Y)} = 1 - 0.024 = 0.976$$

$$\therefore \frac{A\,(Ra\text{-}228)}{A\,(Th\text{-}232)} = 0.976 \quad or \quad A\,(Th\text{-}232) = 1.025\,A\,(Ra\text{-}228)$$

This representation will be true for both naturally occurring Th232 and processed Th232. The other situation to be addressed includes the circumstance when Ra228 and associated decay products were placed as a waste material after purification of Th232. In this situation, the amount of Ra228 present will be much greater than the Th232 present. This information is illustrated in a previous assessment of the ratio of Ra228 concentrations to that of Th232 in raffinate pit wastes. The average ratio was reported as 7.02 in the *Concentration Ratios of Radionuclides* in the U238, U235, and Th232 *Decay Series* (DOE/OR/21548-250), indicating that the average activity concentration for Th232 is 0.14 of the activity concentration for Ra228.

The Record of Decision states that if Th232 and Ra228 are present and not in secular equilibrium, the cleanup criteria apply for the radionuclide with the higher concentration. Thus, for determination of successful cleanup, the use of a Ra-228 ALARA goal of 4.88 pCi/g and a criteria of 6.05 pCi/g will result in removing Th232 to within 5 pCi/g (ALARA) and 6.2 pCi/g (criteria), respectively.

Given this practice, it is recommended that the on-site radiological analyses for Ra-228 concentrations in soil be used to determine attainment of Th-232 cleanup. It is also recommended that 2% of the samples (1 of every 50) that are independently analyzed via an off-site facility be used as a quality check for all radionuclides of interest (U238, Th230, Th232, Ra228, and Ra226). In addition, these numbers should be summarized in post remediation reports for each work package to support the decision to use Ra228 to determine successful cleanup of Th232.

RM/MF/jn

Distribution: ALARA Committee

Steve Warren	Alternates:	Marj Wesley
Ken Meyer		Jack Cooney
Ken Greenwell		Dan Hoffman
Jim Meier		Melissa Lutz

MORRISON KNUDSEN CORPORATION

MK-FERGUSON GROUP

INTER-OFFICE CORRESPONDENCE

DATE: December 4, 1996

TO: Confirmation File

FROM: Melissa Lutz

SUBJECT: **CONTAMINATED SOIL REMOVAL AND CONFIRMATION OF DRAINAGE IN RU008**

During an ORISE visit, a small hotspot was located within CU084. This hotspot had an approximate size measuring 1m X 1m. A 1m X 1m area was excavated to a depth of 0.3m. Field instrument readings remained elevated, therefore 4 additional samples were collected. Uranium results ranged from ND to 176.3 pCi/g; additive radium results were between 3.5 pCi/g to 10.2 pCi/g; and thorium-230 results up to 9.0 pCi/g (sample IDs were SC-08414-S-HS02 thru SC-08414-S-HS05). During the excavating, it was determined that the area was part of an old drainage. Therefore, in order to determine if this was an isolated case, a test pit (2m X 2m x 1m) was dug approximately 3 - 4m to the east of the original excavated area. [Note: Any areas to the west of this excavation are no longer apart of WP420. The western confirmation units in RU008 were redesigned and the removed areas will be addressed under another work package.] Three additional soil samples were collected within this new test pit with similar results. See the following table (SC-08414-S-HS06 thru SC-08414-S-HS08).

Contaminant	Range
Uranium 238	70.6 pCi/g - 396.1 pCi/g
Radium 226/228	6.7 pCi/g - 8.7 pCi/g
Thorium 230	6.2 pCi/g - 9.1 pCi/g

Due to the continued elevated readings, this could no longer be considered an isolated case. A decision was made by the ALARA committee, along with Gary Beyer, to continue excavating test pits along this drainage every 15m (50 ft) to determine the extent of contamination. Excavation continued 30m (100 ft) east of the test pit at which point the meter readings were background. The last test pit was located in CU089. Five confirmation soil samples were then collected every 10 m along the excavated portion of the drainage (using the logic for sampling utility corridors) and analyzed for radiological contaminants of concern. Results for these five samples were below surface ALARA (see attachment).

PAGE 2: **CONTAMINATED SOIL REMOVAL AND CONFIRMATION OF DRAINAGE IN RU008**

In summary, the excavated portion of the drainage went through two CUs: CU084 and CU089. Both of these confirmation units had been previously confirmed and released to AVISCO. The area had not been identified due to the drainage's depth being below the determined contaminated soil excavation cut lines. These new confirmation results do not alter the release status of either confirmation unit. For example, when adding these results to the other confirmation results, the final average concentration remains below ALARA and no single value exceeds three times criteria.

cc: J. Fugate
J. Meier
T. Myer

Attachment

ml/jk

Request: WP192 Purchase Order 46589 Date: 11/07/96

WSSRAP ID	Lab ID	Date Sampled	Date Analyzed	Method	Matrix	Parameter	Conc.	Error	Est. Final Conc.	Units	DL	Comments
SC-08401-U	WSC4404	11/03/96	11/04/96	HASL300	SOIL	RADIUM-226	1.08	0.09	2.45	PCI/G	0.29	
SC-08401-U	WSC4404	11/03/96	11/04/96	HASL300	SOIL	RADIUM-228	1.24	0.13		PCI/G	0.42	
SC-08401-U	WSC4404	11/03/96	11/04/96	CALCULATED	SOIL	EST. THORIUM-232	1.27	0.13		PCI/G	0.42	CALCULATED FROM RADIUM-228 CONCENTRATION
SC-08401-U	WSC4404	11/03/96	11/04/96	HASL300	SOIL	URANIUM-238	4.62	0.85		PCI/G	2.72	
SC-08401-U	WSC4404	11/03/96	11/07/96	EML TH-01	SOIL	THORIUM-230	0.89	0.16		PCI/G	0.72	
SC-08402-U	WSC4405	11/03/96	11/04/96	HASL300	SOIL	RADIUM-226	0.83	0.12	1.88	PCI/G	0.37	
SC-08402-U	WSC4405	11/03/96	11/04/96	HASL300	SOIL	RADIUM-228	ND			PCI/G	1.31	
SC-08402-U	WSC4405	11/03/96	11/04/96	CALCULATED	SOIL	EST. THORIUM-232	0.00			PCI/G	1.31	CALCULATED FROM RADIUM-228 CONCENTRATION
SC-08402-U	WSC4405	11/03/96	11/04/96	HASL300	SOIL	URANIUM-238	ND			PCI/G	4.14	
SC-08402-U	WSC4405	11/03/96	11/07/96	EML TH-01	SOIL	THORIUM-230	0.92	0.16		PCI/G	0.72	
SC-08403-U	WSC4406	11/03/96	11/04/96	HASL300	SOIL	RADIUM-226	0.94	0.11	2.13	PCI/G	0.39	
SC-08403-U	WSC4406	11/03/96	11/04/96	HASL300	SOIL	RADIUM-228	1.23	0.16		PCI/G	0.50	
SC-08403-U	WSC4406	11/03/96	11/04/96	CALCULATED	SOIL	EST. THORIUM-232	1.26	0.16		PCI/G	0.50	CALCULATED FROM RADIUM-228 CONCENTRATION
SC-08403-U	WSC4406	11/03/96	11/04/96	HASL300	SOIL	URANIUM-238	2.80	1.02		PCI/G	2.99	
SC-08403-U	WSC4406	11/03/96	11/07/96	EML TH-01	SOIL	THORIUM-230	1.07	0.16		PCI/G	0.72	
SC-08901-U	WSC4407	11/03/96	11/04/96	HASL300	SOIL	RADIUM-226	1.06	0.09	2.41	PCI/G	0.30	
SC-08901-U	WSC4407	11/03/96	11/04/96	HASL300	SOIL	RADIUM-228	1.24	0.13		PCI/G	0.38	
SC-08901-U	WSC4407	11/03/96	11/04/96	CALCULATED	SOIL	EST. THORIUM-232	1.27	0.13		PCI/G	0.38	CALCULATED FROM RADIUM-228 CONCENTRATION
SC-08901-U	WSC4407	11/03/96	11/04/96	HASL300	SOIL	URANIUM-238	ND			PCI/G	3.27	
SC-08901-U	WSC4407	11/03/96	11/07/96	EML TH-01	SOIL	THORIUM-230	1.08	0.14		PCI/G	0.72	
SC-08902-U	WSC4408	11/03/96	11/04/96	HASL300	SOIL	RADIUM-226	1.15	0.10	2.61	PCI/G	0.35	
SC-08902-U	WSC4408	11/03/96	11/04/96	HASL300	SOIL	RADIUM-228	ND			PCI/G	0.89	
SC-08902-U	WSC4408	11/03/96	11/04/96	CALCULATED	SOIL	EST. THORIUM-232	0.00			PCI/G	0.89	CALCULATED FROM RADIUM-228 CONCENTRATION
SC-08902-U	WSC4408	11/03/96	11/04/96	HASL300	SOIL	URANIUM-238	17.93	2.20		PCI/G	3.86	
SC-08902-U	WSC4408	11/03/96	11/07/96	EML TH-01	SOIL	THORIUM-230	1.33	0.19		PCI/G	0.72	

MORRISON KNUDSEN CORPORATION

MK-FERGUSON GROUP

INTER-OFFICE CORRESPONDENCE

DATE: February 12, 1997

TO: Confirmation File

FROM: Melissa Lutz

SUBJECT: **WP420 CONFIRMATION CHANGES IN RU008 (ZONE 3)**

There have been a number of changes to the confirmation units located in RU008 as outlined in the *Confirmation Sampling Plan Details for the Chemical Plant Area Foundations and Contaminated Soils Removal (WP-420)*, Rev 0 (Document Number DOE/OR/21548-590).

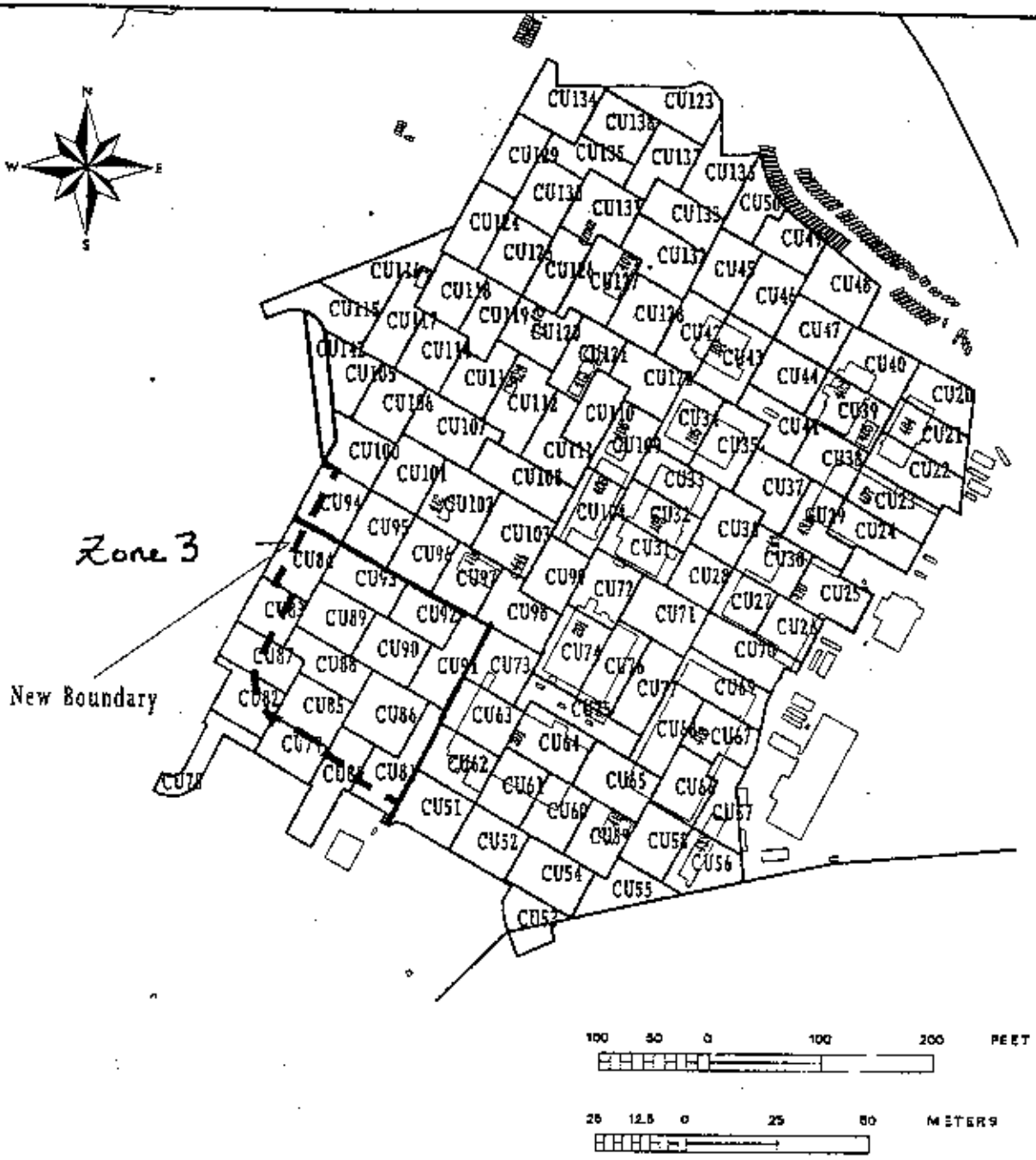
The changes made to RU008 were driven by the construction of the "dirty" road as part of WP420 and the location of the interceptor trench along the eastern side of Raffinate Pit .3. The western boundaries of CU082, CU083, CU084, and CU087 were moved east, while the southern boundries of CU080 and CU081 were moved north. These boundary changes considerably shrunk the size of those confirmation unit. In addition, CU078 and CU079 were deleted entirely from the WP420 confirmation activities.

The new boundaries for RU008 (Zone 3) are documtented on the attached figure 2-1. The coordinates for the new boundry are also included. The areas deleted from Zone 3 (RU008) will be confirmed under a later work package if necessary. If you have any questions, please call me at ext. 3544.

ML/jn

Attachment

cc: D. Powell
M. Kerr
J. Meier



LEGEND

RU006 -- CU020 THRU CU050
RU007 -- CU051 THRU CU077
RU008 -- CU078 THRU CU093
RU009 -- CU094 THRU CU122, CU142
RU010 -- CU123 THRU CU138

Remedial Units for WP-420

Figure: 2-1

REPORT NO.: DOE/OR/21548-590		EXHIBIT NO.: E/CP/006/0196	
ORIGINATOR: EMD	DRAWN BY: WSSRAP GIS	DATE: 01/97	

754416.5094	1043020.8408
754422.2200	1043017.6433
754450.8459	1043001.6145
754434.8172	1042972.9886
754418.7884	1042944.3626
754402.7597	1042915.7367
754386.7310	1042887.1108
754374.0450	1042864.4547
754370.7022	1042858.4848
754354.6735	1042829.8589
754338.6447	1042801.2330
754322.6160	1042772.6070
754306.5872	1042743.9811
754290.5585	1042715.3551
754319.1844	1042699.3264
754333.4974	1042691.3120
754338.0664	1042688.7537
754275.9800	1042573.1100
754264.5815	1042550.3124
754247.9209	1042512.1950
754237.4700	1042481.8800
754236.8138	1042470.2911
754239.8430	1042454.8927
754244.1344	1042439.2419
754248.1733	1042427.1251
754254.2317	1042414.2510
754262.3096	1042399.1050
754266.6009	1042392.0369
754274.6788	1042382.6969
754284.4915	1042368.7592
754289.4295	1042377.5780
754318.0554	1042361.5493
754346.6814	1042345.5205
754375.3073	1042329.4918
754403.9333	1042313.4630
754432.5592	1042297.4343
754424.5448	1042283.1213
754438.8578	1042275.1069
754467.4837	1042259.0782
754496.1097	1042243.0495
754510.4226	1042235.0351
754502.4083	1042220.7221
754531.0342	1042204.6934
754559.6601	1042188.6646
754588.2861	1042172.6359
754607.3448	1042161.9642

APPENDIX F

ORISE Hot Spot Report Table

APPENDIX F
TABLE F-1
ORISE Hot Spot Summary for WP420 (RU8)

CU#	DATE	HOTSPOT PARAMETER	WSSRAP ID	LOCATION DESCRIPTION	APPROX. SIZE	ORISE 1X1 READINGS	PMC 44-9 READINGS	SAMPLE RESULTS	REMEDIATED (Y OR N)	RESULTS AFTER REMEDIATION
84	10/09/96	U, Ra, Th	08414-S-HS01	15' SE of sample ID	3' x 2'	-	429	84	N	< Criteria
84	10/09/96	U, Ra, Th	08419-S-HS01	15' N of sample ID	3' x 2'	-	900	885	Y	Dug test pits* - see text
85	09/19/96	No sample collected	08004-S-HS01	12' North of sample ID	2' x 2'	40k	5000	yellowcake	Y	U = 26.43 pCi/g

* Test pits showed that contamination extended 70' to the east. Area was remediated and samples collected.

APPENDIX G

QA/QC Comparison to Analytical Data

APPENDIX G TABLE G-1

WSSRAP ID	PARAMETER	CONC	ERR	DL	UNITS	RPD	DER	VAL QUAL	METHOD	MATRIX	CATEGORY	DIL	LAB ID	LAB QUAL	LAB REQU	DATE ANA	SAMPLINK	DATE SAM
SC-06105-S	URANIUM-238	191	15.1	11.6	PCI/G	N/A	N/A	A	HASL300	SOIL	RADIOCHEMICAL	1	WSC4043		WP0156.0	10/7/96	0000025002	10/4/96
SC-06105-S-DU	URANIUM-238	187.00	14.80	11.00	PCI/G	2.1%	0.13	A	HASL300	SOIL	RADIOCHEMICAL	1	WSC4043DU		WP0156.0	10/7/96	0000030040	10/4/96
SC-06105-S-FR	URANIUM-238	121.00	9.58	6.37	PCI/G	44.9%	0.22	A	HASL300	SOIL	RADIOCHEMICAL	1	WSC4044		WP0156.0	10/7/96	0000030041	10/4/96
SC-06105-S-SD	URANIUM-238	410.00	30.70	0.24	PCI/G	72.9%	4.78	*	HASL 300	SOIL	RADIOCHEMICAL	1	9610162-02		GE2006.0	10/13/96	0000030043	10/4/96
SC-06426-S	THORIUM-230	2.15	0.26	0.72	PCI/G	N/A	N/A	*	EML TH-01	SOIL	RADIOCHEMICAL	1	WSC4032		WP0155.0	10/6/96	0000025086	10/3/96
SC-06426-S	URANIUM-238	ND		4.01	PCI/G	N/A	N/A	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC4032		WP0155.0	10/5/96	0000025086	10/3/96
SC-06426-S-DU	THORIUM-230	2.40	0.23	0.72	PCI/G	11.0%	0.51	*	EML TH-01	SOIL	RADIOCHEMICAL	1	WSC4032DU		WP0155.0	10/6/96	0000030483	10/3/96
SC-06426-S-DU	URANIUM-238	1.88	0.78	2.33	PCI/G	NOTE 1	NOTE 1	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC4032DU		WP0155.0	10/5/96	0000030483	10/3/96
SC-06426-S-EB	THORIUM-230	0.34	0.11	0.08	PCI/L	N/A	N/A	*	HASL 300	SURFACE WATER	RADIOCHEMICAL	1	9610162-03		GE2006.0	10/13/96	0000030479	10/3/96
SC-06426-S-FR	THORIUM-230	2.23	0.27	0.72	PCI/G	3.7%	0.02	*	EML TH-01	SOIL	RADIOCHEMICAL	1	WSC4033		WP0155.0	10/6/96	0000030482	10/3/96
SC-06426-S-FR	URANIUM-238	2.23	0.27	0.72	PCI/G	NOTE 1	NOTE 1	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC4033		WP0155.0	10/5/96	0000030482	10/3/96
SC-06426-S-SD	THORIUM-230	4.09	0.84	0.21	PCI/G	62.2%	1.76	*	HASL 300	SOIL	RADIOCHEMICAL	1	9610162-04	B	GE2006.0	10/14/96	0000030480	10/3/96
SC-06426-S-SD	URANIUM-238	2.46	0.33	0.10	PCI/G	NOTE 1	NOTE 1	*	HASL 300	SOIL	RADIOCHEMICAL	1	9610162-04		GE2006.0	10/13/96	0000030480	10/3/96
SC-06517-S	URANIUM-238	ND		3.31	PCI/G	N/A	N/A	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3641		WP0140.0	9/12/96	0000025105	9/11/96
SC-06517-S-DU	URANIUM-238	ND		2.98	PCI/G	NOTE 1	NOTE 1	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3641DU		WP0140.0	9/12/96	0000030032	9/11/96
SC-06517-S-FR	URANIUM-238	ND	0.00	4.15	PCI/G	NOTE 1	NOTE 1	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3642		WP0140.0	9/12/96	0000030035	9/11/96
SC-06517-S-SD	URANIUM-238	1.67	0.44	0.10	PCI/G	NOTE 1	NOTE 1	*	EML U-02	SOIL	RADIOCHEMICAL	1	9609091-04	J	TC0060.0	9/25/96	0000030033	9/11/96
SC-06610-S	URANIUM-238	15.6	2.37	5.07	PCI/G	N/A	N/A	A	HASL300	SOIL	RADIOCHEMICAL	1	WSC4065		WP0156.0	10/8/96	0000025119	10/4/96
SC-06610-S	AROCLOR-1248	ND		72	UG/KG	N/A	N/A	U	EPA 8080A	SOIL	PEST/PCBS	2	12411014	U	QT2007.0	10/9/96	0000025119	10/4/96
SC-06610-S	AROCLOR-1254	1400		72	UG/KG	N/A	N/A	A	EPA 8080A	SOIL	PEST/PCBS	2	12411014		QT2007.0	10/9/96	0000025119	10/4/96
SC-06610-S	AROCLOR-1260	ND		72	UG/KG	N/A	N/A	U	EPA 8080A	SOIL	PEST/PCBS	2	12411014	U	QT2007.0	10/9/96	0000025119	10/4/96
SC-06610-S-DU	URANIUM-238	15.60	2.12	3.86	PCI/G	6.2%	0.22	A	HASL300	SOIL	RADIOCHEMICAL	1	WSC4065DU		WP0156.0	10/8/96	0000030555	10/4/96
SC-06610-S-EB	AROCLOR-1248	ND		0.12	UG/L	N/A	N/A	UJ	EPA 8080A	GROUNDWATER	PEST/PCBS	1	9610162-05	U	GE2006.0	10/13/96	0000030565	10/4/96
SC-06610-S-EB	AROCLOR-1254	ND		0.12	UG/L	N/A	N/A	UJ	EPA 8080A	GROUNDWATER	PEST/PCBS	1	9610162-05	U	GE2006.0	10/13/96	0000030565	10/4/96
SC-06610-S-EB	AROCLOR-1260	ND		0.12	UG/L	N/A	N/A	UJ	EPA 8080A	GROUNDWATER	PEST/PCBS	1	9610162-05	U	GE2006.0	10/13/96	0000030565	10/4/96
SC-06610-S-FR	AROCLOR-1248	ND	0.00	350.00	UG/KG	NOTE 1	N/A	U	EPA 8080A	SOIL	PEST/PCBS	10	12411015	U	QT2007.0	10/9/96	0000030553	10/4/96
SC-06610-S-FR	AROCLOR-1254	ND	0.00	350.00	UG/KG	NOTE 1	N/A	A	EPA 8080A	SOIL	PEST/PCBS	10	12411015		QT2007.0	10/9/96	0000030553	10/4/96
SC-06610-S-FR	AROCLOR-1260	ND	0.00	350.00	UG/KG	NOTE 1	N/A	U	EPA 8080A	SOIL	PEST/PCBS	10	12411015	U	QT2007.0	10/9/96	0000030553	10/4/96
SC-06610-S-FR	URANIUM-238	ND	0.00	350.00	PCI/G	NOTE 1	NOTE 1	A	HASL 300	SOIL	RADIOCHEMICAL	1	WSC4066		WP0156	10/8/96	0000030553	10/4/96
SC-06610-S-MD	AROCLOR-1260	330.00		72.00	UG/KG	6.3%	N/A	A	EPA 8080A	SOIL	PEST/PCBS	2	12411014MD		QT2007.0	10/9/96	0000030563	10/4/96
SC-06610-S-MS	AROCLOR-1260	310.00		72.00	UG/KG	N/A	N/A	A	EPA 8080A	SOIL	PEST/PCBS	2	12411014MS		QT2007.0	10/9/96	0000030564	10/4/96
SC-06610-S-SD	URANIUM-238	22.60	1.59	0.10	PCI/G	30.6%	1.52	*	HASL 300	SOIL	RADIOCHEMICAL	1	9610162-06		GE2006.0	10/13/96	0000030554	10/4/96
SC-06610-S-SD	AROCLOR-1254	9440.00		883.00	UG/KG	148.3%	N/A	A	EPA 8080A	SOIL	PEST/PCBS	200	9610162-06	P	GE2006.0	10/15/96	0000030554	10/4/96
SC-06610-S-SD	AROCLOR-1248	ND		44.20	UG/KG	NOTE 1	N/A	U	EPA 8080A	SOIL	PEST/PCBS	10	9610162-06	U	GE2006.0	10/15/96	0000030554	10/4/96
SC-06610-S-SD	AROCLOR-1260	ND		44.20	UG/KG	NOTE 1	N/A	U	EPA 8080A	SOIL	PEST/PCBS	10	9610162-06	U	GE2006.0	10/15/96	0000030554	10/4/96
SC-06713-S	URANIUM-238	ND		3.34	PCI/G	N/A	N/A	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3667		WP0141.0	9/15/96	0000025280	9/12/96
SC-06713-S-DU	URANIUM-238	ND		3.28	PCI/G	NOTE 1	NOTE 1	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3667DU		WP0141.0	9/15/96	0000030079	9/12/96
SC-06713-S-FR	URANIUM-238	ND	0.00	4.11	PCI/G	NOTE 1	NOTE 1	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3668		WP0141.0	9/15/96	0000030078	9/12/96
SC-06713-S-SD	URANIUM-238	2.31	0.65	0.19	PCI/G	NOTE 1	NOTE 1	*	EML U-02	SOIL	RADIOCHEMICAL	1	9609091-05	J	TC0060.0	9/26/96	0000030082	9/12/96
SC-06813-S	URANIUM-238	ND		4.03	PCI/G	N/A	N/A	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3685		WP0141.0	9/15/96	0000025300	9/12/96
SC-06813-S-DU	URANIUM-238	ND		4.29	PCI/G	NOTE 1	NOTE 1	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3685DU		WP0141.0	9/15/96	0000030076	9/12/96
SC-06813-S-FR	URANIUM-238	2.39	0.67	2.41	PCI/G	NOTE 1	NOTE 1	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3686		WP0141.0	9/15/96	0000030077	9/12/96
SC-06813-S-SD	URANIUM-238	2.48	0.69	0.12	PCI/G	NOTE 1	NOTE 1	*	EML U-02	SOIL	RADIOCHEMICAL	1	9609091-06	J	TC0060.0	9/26/96	0000030084	9/12/96
SC-06914-S	URANIUM-238	ND		4.37	PCI/G	N/A	N/A	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3697		WP0141.0	9/15/96	0000025320	9/12/96
SC-06914-S-DU	URANIUM-238	ND		4.41	PCI/G	NOTE 1	NOTE 1	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3697DU		WP0141.0	9/15/96	0000030080	9/12/96
SC-06914-S-FR	URANIUM-238	3.18	0.97	3.86	PCI/G	NOTE 1	NOTE 1	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3698		WP0141.0	9/15/96	0000030081	9/12/96
SC-06914-S-SD	URANIUM-238	3.15	0.71	0.05	PCI/G	NOTE 1	NOTE 1	*	EML U-02	SOIL	RADIOCHEMICAL	1	9609091-07	J	TC0060.0	9/26/96	0000030066	9/12/96
SC-09014-S	URANIUM-238	ND		4.31	PCI/G	N/A	N/A	U	HASL300	SOIL	RADIOCHEMICAL	1	WSC4086		WP0156.0	10/8/96	0000025341	10/4/96
SC-09014-S-DU	URANIUM-238	ND		4.25	PCI/G	NOTE 1	NOTE 1	U	HASL300	SOIL	RADIOCHEMICAL	1	WSC4086DU		WP0156.0	10/8/96	0000030546	10/4/96
SC-09014-S-FR	URANIUM-238	2.06	0.57	2.12	PCI/G	NOTE 1	NOTE 1	U	HASL300	SOIL	RADIOCHEMICAL	1	WSC4087		WP0156.0	10/8/96	0000030548	10/4/96
SC-09014-S-SD	URANIUM-238	2.35	0.33	0.12	PCI/G	NOTE 1	NOTE 1	*	HASL 300	SOIL	RADIOCHEMICAL	1	9610162-08		GE2006.0	10/13/96	0000030545	10/4/96
SC-09113-S	URANIUM-238	10.6	1.41	3.69	PCI/G	N/A	N/A	A	HASL300	SOIL	RADIOCHEMICAL	1	WSC4091		WP0156.0	10/8/96	0000025383	10/4/96
SC-09113-S-DU	URANIUM-238	11.80	2.05	3.82	PCI/G	10.7%	0.35	A	HASL300	SOIL	RADIOCHEMICAL	1	WSC4091DU		WP0156.0	10/8/96	0000030550	10/4/96
SC-09113-S-FR	URANIUM-238	12.80	2.25	4.38	PCI/G	18.8%	0.23	A	HASL300	SOIL	RADIOCHEMICAL	1	WSC4092		WP0156.0	10/4/96	0000030552	10/4/96
SC-09113-S-SD	URANIUM-238	17.40	1.87	1.24	PCI/G	48.6%	2.07	*	HASL 300	SOIL	RADIOCHEMICAL	1	9610162-10		GE2006.0	10/11/96	0000030549	10/4/96
SC-09203-S	URANIUM-238	ND		4.07	PCI/G	N/A	N/A	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC4210		WP0164.0	10/11/96	0000025396	10/10/96

APPENDIX G TABLE G-1

WSSRAP ID	PARAMETER	CONC	ERR	DL	UNITS	RPD	DER	VAL QUAL	METHOD	MATRIX	CATEGORY	DIL	LAB ID	LAB QUAL	LAB REQU	DATE ANA	SAMPLINK	DATE SAM
SC-09203-S-DU	URANIUM-238	ND		4.25	PCI/G	NOTE 1	NOTE 1	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC4210DU		WP0164.0	10/13/96	0000030670	10/10/96
SC-09203-S-FR	URANIUM-238	ND	0.00	3.18	PCI/G	NOTE 1	NOTE 1	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC4211		WP0164.0	10/13/96	0000030672	10/10/96
SC-09203-S-SD	URANIUM-238	2.88	2.09	1.95	PCI/G	NOTE 1	NOTE 1	*	HASL 300	SOIL	RADIOCHEMICAL	1	9610330-09		GE2014.0	10/16/96	0000030673	10/10/96
SC-09303-S	URANIUM-238	ND		3.50	PCI/G	N/A	N/A	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3721		WP0142.0	9/13/96	0000025408	9/12/96
SC-09303-S-DU	URANIUM-238	ND		3.17	PCI/G	NOTE 1	NOTE 1	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3721DU		WP0142.0	9/13/96	0000030075	9/12/96
SC-09303-S-FR	URANIUM-238	ND	0.00	3.15	PCI/G	NOTE 1	NOTE 1	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3722		WP0142.0	9/13/96	0000030074	9/12/96
SC-09303-S-SD	URANIUM-238	1.37	0.39	0.11	PCI/G	NOTE 1	NOTE 1	*	EML U-02	SOIL	RADIOCHEMICAL	1	9609091-08	J	TO0080.0	9/26/96	0000030086	9/12/96
SC-09323-S	URANIUM-238	ND		4.53	PCI/G	N/A	N/A	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3742		WP0142.0	9/13/96	0000025426	9/12/96
SC-09323-S-DU	URANIUM-238	3.54	0.73	2.49	PCI/G	NOTE 1	NOTE 1	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3742DU		WP0142.0	9/13/96	0000030071	9/12/96
SC-09323-S-FR	URANIUM-238	2.94	0.73	2.50	PCI/G	NOTE 1	NOTE 1	*	HASL300	SOIL	RADIOCHEMICAL	1	WSC3743		WP0142.0	9/13/96	0000030073	9/12/96
SC-09323-S-SD	URANIUM-238	2.03	0.54	0.11	PCI/G	NOTE 1	NOTE 1	*	EML U-02	SOIL	RADIOCHEMICAL	1	9609091-09	J	TO0080.0	9/26/96	0000030090	9/12/96

APPENDIX G TABLE G-1

WSSRAP ID	PARAMETER	CONC	ERR	DL	UNITS	RPD	DER	VAL QUAL	METHOD	MATRIX	CATEGORY	DIL	LAB ID	LAB QUAL	LAB REQU	DATE ANA	SAMPLINK	DATE SAM

LEGEND:

WSSRAP ID	WSSRAP IDENTIFICATION CODE
PARAMETER	PARAMETER THAT WAS ANALYZED
CONC	CONCENTRATION (ND = NON-DETECTED)
ERR	ANALYTICAL ERROR
DL	DETECTION LIMIT
UNITS	APPROPRIATE UNITS
%RPD	RELATIVE PERCENT DIFFERENCE
DER	DERIVED ERROR RATIO
VAL QUAL	VALIDATION QUALIFIER:
	A = DATA MEETING ALL QA/QC REQUIREMENTS. THE PARAMETER WAS ANALYZED FOR AND DETECTED.
	U = DATA MEETING ALL QA/QC REQUIREMENTS. THE PARAMETER WAS ANALYZED FOR BUT NOT DETECTED. IF A NUMBER IS INCLUDED WITH THE QUALIFIER, THE DL HAS BEEN RAISED TO THE LEVEL IN THE SAMPLE DUE TO BLANK CONTAMINATION
	J = DATA THAT ARE AN ESTIMATE OR ARE ADEQUATE FOR A SEMI-QUANTITATIVE ASSESSMENT.
	UJ = THE PARAMETER WAS ANALYZED FOR, BUT WAS NOT DETECTED. THE ASSOCIATED VALUE IS AN ESTIMATED QUANTITY.
	N = PRESUMPTIVE EVIDENCE OF PRESENCE OF PARAMETER WITH NO ESTIMATION OF QUANTITY.
	NJ = PRESUMPTIVE EVIDENCE OF PRESENCE OF PARAMETER AT AN ESTIMATED QUANTITY.
	DL = DETECTION LIMIT REQUIREMENTS HAVE NOT BEEN MET. DATA QUALITY OBJECTIVES MAY NOT BE MET.
	UI = UNCERTAIN IDENTIFICATION OF THE PARAMETER.
	JE = THE RADIOLOGICAL UNCERTAINTY IS AN ESTIMATED QUANTITY.
	R = DATA THE ATE UNUSABLE (PARAMETER MAY OR MAY NOT BE PRESENT).
	* = DATA THAT HAVE BEEN VALIDATED.
	V = DATA THAT APPEAR TO BE VALID BASED ON SIMILAR DATA FROM IDENTICAL SAMPLING LOCATIONS OR BY COMPARISON TO HISTORICAL RECORDS.
	O = DATA THAT ARE ON HOLD
	X = DATA THAT CANNOT BE VALIDATED DUE TO MISSING LABORATORY INFORMATION.
METHOD	ANALYTICAL METHOD
MATRIX	SAMPLE MATRIX
CATEGORY	ANALYTICAL CATEGORY
DIL	DILUTION FACTOR
LAB ID	IDENTIFICATION GIVEN BY THE LAB
LAB QUAL	LABORATORY QUALIFIER
LAB REQU	LABORATORY REQUEST NUMBER
DATE ANA	DATE ANALYZED
SAMPLINK	SAMPLE LINK NUMBER
DATE SAM	DATE SAMPLED

APPENDIX H

Precision and Accuracy Comparison Tables

Appendix H Table H-1
Data Quality Requirement Goals for analytical data

Category	Analytical Parameter	Precision* (soil) RPD (%)	Precision* (soil) DER	Accuracy (soil) REC (%)	Precision* (water) RPD (%)	Precision* (water) DER	Accuracy (water) REC (%)
Radiological	Natrual Uranium, U-235, U-238	<= 50	1.00	+/- 30	<= 20	1.00	+/- 25
	Ra-226, Ra-228, Th-230, Th-232	<= 50	1.00	+/- 30	<= 20	1.00	+/- 25
	Gross Alpha, Gross Beta	<= 50	1.00	+/- 30	<= 20	1.00	+/- 25
Nitroaromatics	All	<= 35	N/A	+/- 25	<= 20	N/A	+/- 25
Anions	NO3, NO2, CL, F, SO4	<= 35	N/A	+/- 50	<= 20	N/A	+/- 25
Metals	All	<= 35	N/A	+/- 25	<= 20	N/A	+/- 25
Volitiles	All	<= 35	N/A	+/- 40	<= 20	N/A	+/- 25
Semi-Volatiles	All	<= 35	N/A	+/- 40	<= 20	N/A	+/- 25
PAHs	All	<= 35	N/A	+/- 40	<= 20	N/A	+/- 25
Pest/PCBs	All	<= 35	N/A	+/- 40	<= 20	N/A	+/- 25
All Others		<= 50	N/A	+/- 50	<= 20	N/A	+/- 25

* Not valid for values <= 5 * Detection Limit

Appendix H Table H-2
Comparison of Data Quality Requirement Goals With Matrix Duplicate Samples

Parameter	Number of Samples	Number of Detects	RPD Range	RPD Average	DER Range	DER Average	Evaluation and Summary of Detects
THORIUM-230	1	1	11.0-11.0%	11.0%	0.51-0.51	0.51	1 PA OR DU <=5*DL, OR =ND
							0 PA & DU >5*DL, RPD<=50%, DER <=1
							0 PA & DU >5*DL, RPD >50%, DER <=1
							0 PA & DU >5*DL, RPD <=50%, DER >1
							0 PA & DU >5*DL, RPD >50%, DER >1
URANIUM-238	12	5	2.1-10.7%	6.3%	0.13-0.35	0.23	11 PA OR DU <=5*DL, OR =ND
							1 PA & DU >5*DL, RPD<=50%, DER <=1
							0 PA & DU >5*DL, RPD >50%, DER <=1
							0 PA & DU >5*DL, RPD <=50%, DER >1
							0 PA & DU >5*DL, RPD >50%, DER >1

PA = RESPECTIVE PARENT SAMPLE
DU = MATRIX DUPLICATE SAMPLE
DER = DUPLICATE ERROR RATIO
RPD = RELATIVE PERCENT DIFFERENCE
DL = DETECTION LIMIT

Appendix H Table H-3
Comparison of Data Quality Requirement Goals with Secondary Duplicate samples

Parameter	Number of Samples	Number of Detects	RPD Range	RPD Average	DER Range	DER Average	Evaluation and Summary of Detects
AROCLOR-1248	1	0	N/A	N/A	N/A	N/A	1 PA OR SD <=5*DL, OR =ND
							0 PA & SD >5*DL, RPD<=35%
							0 PA & SD >5*DL, RPD >35%
AROCLOR-1254	1	1	148.0-146.0	148.0%	N/A	N/A	0 PA OR SD <=5*DL, OR =ND
							0 PA & SD >5*DL, RPD<=35%
							1 PA & SD >5*DL, RPD >35%
AROCLOR-1260	1	0	N/A	N/A	N/A	N/A	1 PA OR SD <=5*DL, OR =ND
							0 PA & SD >5*DL, RPD<=35%
							0 PA & SD >5*DL, RPD >35%
THORIUM-230	1	1	62.2-62.2%	62.2%	1.76-1.76	1.76	1 PA OR SD <=5*DL, OR =ND
							0 PA & SD >5*DL, RPD<=50%, DER <=1
							0 PA & SD >5*DL, RPD >50%, DER <=1
							0 PA & SD >5*DL, RPD <=50%, DER >1
							0 PA & SD >5*DL, RPD >50%, DER >1
URANIUM-238	12	12	30.6-72.9%	50.7%	1.52-4.78	2.79	11 PA OR SD <=5*DL, OR =ND
							0 PA & SD >5*DL, RPD<=50%, DER <=1
							0 PA & SD >5*DL, RPD >50%, DER <=1
							0 PA & SD >5*DL, RPD <=50%, DER >1
							1 PA & SD >5*DL, RPD >50%, DER >1

PA = RESPECTIVE PARENT SAMPLE
SD = SECONDARY DUPLICATE SAMPLE
DER = DUPLICATE ERROR RATIO
RPD = RELATIVE PERCENT DIFFERENCE
DL = DETECTION LIMIT

Appendix H Table H-4

Comparison of Data Quality Requirement Goals with Field Replicate Samples

Parameter	Number of Samples	Number of Detects	RPD Range	RPD Average	DER Range	DER Average	Evaluation and Summary of Detects	
AROCLOR-1248	1	0	N/A	N/A	N/A	N/A	1	PA OR FR <=5*DL, OR =ND
							0	PA & FR >5*DL, RPD<=35%
							0	PA & FR >5*DL, RPD >35%
AROCLOR-1254	1	0	N/A	N/A	N/A	N/A	1	PA OR FR <=5*DL, OR =ND
							0	PA & FR >5*DL, RPD<=35%
							0	PA & FR >5*DL, RPD >35%
AROCLOR-1260	1	0	N/A	N/A	N/A	N/A	1	PA OR FR <=5*DL, OR =ND
							0	PA & FR >5*DL, RPD<=35%
							0	PA & FR >5*DL, RPD >35%
THORIUM-230	1	1	3.7-3.7%	3.7%	0.02-0.02	0.02	1	PA OR FR <=5*DL, OR =ND
							0	PA & FR >5*DL, RPD<=50%, DER <=1
							0	PA & FR >5*DL, RPD >50%, DER <=1
							0	PA & FR >5*DL, RPD <=50%, DER >1
							0	PA & FR >5*DL, RPD >50%, DER >1
URANIUM-238	12	7	16.8-44.9%	31.9%	0.22-0.23	0.23	11	PA OR FR <=5*DL, OR =ND
							1	PA & FR >5*DL, RPD<=50%, DER <=1
							0	PA & FR >5*DL, RPD >50%, DER <=1
							0	PA & FR >5*DL, RPD <=50%, DER >1
							0	PA & FR >5*DL, RPD >50%, DER >1

PA = RESPECTIVE PARENT SAMPLE
FR = FIELD REPLICATE SAMPLE
DER = DUPLICATE ERROR RATIO
RPD = RELATIVE PERCENT DIFFERENCE
DL = DETECTION LIMIT

Appendix H Table H-5

Comparison of Data Quality Requirement Goals with Matrix Spike Duplicate Samples

Parameter	Number of Samples	Number of Detects	RPD Range	RPD Average	DER Range	DER Average	Evaluation and Summary of Detects	
AROCLOR-1260	1	1	6.3-6.3%	6.3%	N/A	N/A	1	PA OR MD <=5*DL, OR =ND
							0	PA & MD >5*DL, RPD<=35%
							0	PA & MD >5*DL, RPD >35%

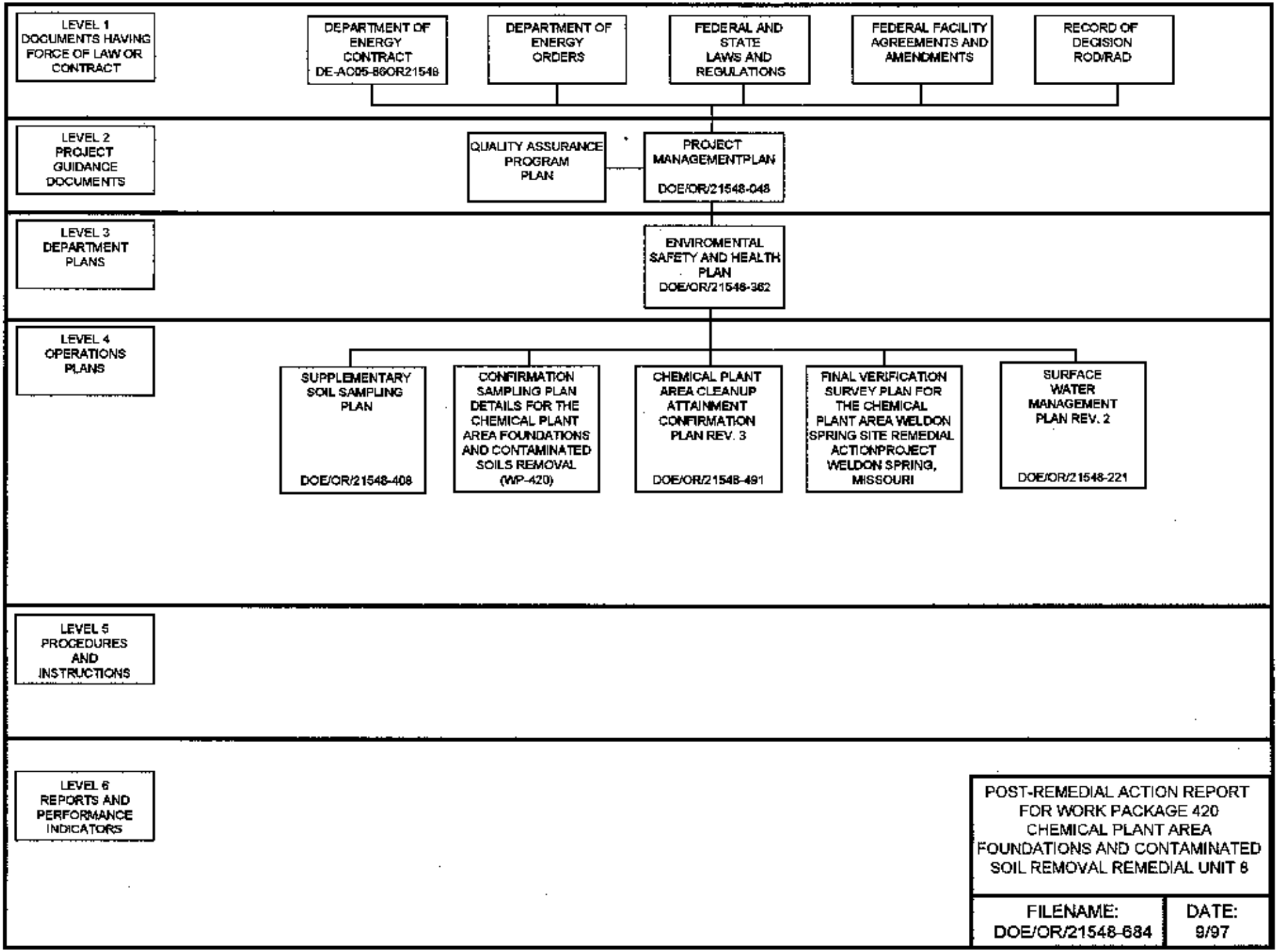
PA = RESPECTIVE PARENT SAMPLE
MD = MATRIX SPIKE DUPLICATE SAMPLE
DER = DUPLICATE ERROR RATIO
RPD = RELATIVE PERCENT DIFFERENCE
DL = DETECTION LIMIT

Appendix H Table H-6
Comparison of Data Quality Requirement Goals with Matrix Spike Samples

PARAMETER	Number of Samples	Number of Detects	REC Range	REC Average	Evaluation and Summary of Detects	
AROCLOR-1260	1	1	88.0-88.0%	88.0%	1	REC +/- 40%
					0	REC > +/- 40%

APPENDIX I

Document Hierarchy


LEVEL 1
DOCUMENTS HAVING FORCE OF LAW OR CONTRACT
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DEPARTMENT OF ENERGY ORDERS
FEDERAL AND STATE LAWS AND REGULATIONS
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POST-REMEDIAL ACTION REPORT FOR WORK PACKAGE 420 CHEMICAL PLANT AREA FOUNDATIONS AND CONTAMINATED SOIL REMOVAL REMEDIAL UNIT 8
FILENAME: DOE/OR/21548-684
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